APRIL 29, 1961

Chemical Week

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ON THE COVER: Rotterdam's teeming harbor exemplifies the activity that makes the Netherlands the No. 1 European target for U.S. chemical investors (p. 55).

Chemical Week

Vol. 88, No. 17 APRIL 29, 1961

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How Can We Make Jobs?

WHEN OUR ECONOMY climbs to new heights, hopefully a few months hence, we will still be faced with a disheartening paradox: relatively high unemployment in the midst of prosperity. More people will be working than ever before, but the jobless may still number over 6% of our total work force.

Fault can be found with the way we derive our figures in comparison with the methods used in other countries. But we mustn't let the critics throw dust in our eyes. Whatever the counting technique, the fact remains that millions are looking for work.

Part of the problem goes back to the low national birth rate before World War II. There are actually fewer people in the 20-30 age group than there were a few years ago. It first appears that this would ease the situation, since fewer young men and women are seeking their first jobs; but this result is more than offset by another one: this same age group, now smaller, accounts for a disproportionate share of durable goods purchases. These are the people who are getting married, building houses and buying furniture, appliances and cars. Industrial production is not likely to perk up appreciably until today's plenteous teenagers grow up into buyers of durable goods—but before they become buyers they too must find jobs.

Another facet of the problem is competition from abroad. Although exports of chemical and allied products far outweigh imports, other industries—notably textiles—are in the opposite situation. But, despite its favorable balance of trade, the chemical industry has been forced—against the will of some of its leaders (Dow's Carl Gerstacker for one)—to protect its foreign business by building plants abroad. This makes profits for American investors, but it exports jobs. However, in defense of our industry's putting over 15% of its capital investments in foreign capacity, it can be argued that if American firms didn't own those plants, someone else would—and there would still be no more jobs available here.

A third part of the problem is automation, which is simply an intensive continuation of the industrial revolution that led French workers to throw their wooden shoes into the machines they believed were stealing away their jobs. Automation does not necessarily reduce the total manpower demand; but it tends to create a shortage of skilled technicians and a surplus of less-skilled workers. And it must certainly boost productivity. Whenever productivity increases faster than consumer demand, jobs are threatened. The answer lies not in slowing our productivity gains, but in speeding growth of consumption.

The way to increase consumption is to create new and improved products that satisfy wants, both known and unknown. It can't truly be said that anyone needed a telephone before it was invented, but today it would be extremely cumbersome to do business without one. New and improved products are the fruits of research and development. It has been estimated that every $1 spent on research eventually results in $5 of plant investment and about the same amount in annual sales. If $30,000 in annual sales provides one job, it follows then that $6,000 spent on research will eventually create that job.

The Kennedy Administration will be faced with the specter of joblessness for years to come. In addition to applying immediate palliatives, it should seek a long-term cure by providing tax incentives for investment both in research and in the plants that must be built to capitalize on the products of research.

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LETTERS

Add Independent

TO THE EDITOR: Your article (*March 11, p. 64*) concerning Denver, Colo., was well written; however, we were quite disappointed to see . . . Independent Petrochemical Co., a wholly owned subsidiary of Independent Oil Co. of St. Louis, Mo. [overlooked]. . . .

At the present time [we] represent Shell Oil, Shell Chemical, Du Pont, Commercial Solvents, and Velsicol.

PAUL L. BROWNE
Independent Petrochemical Co.
Denver

Left to Right

TO THE EDITOR: My colleagues and I have read your article (*March 25, p. 53*) on reactive dyestuffs.

This is a complicated subject, and we feel that Mr. Untersee and the rest of your staff have dealt with it accurately and given a fair appraisal of the present situation. . . .

But the names of the management team in the picture (*p. 53*) were wrongly quoted. From left to right they should be: Technical Service Manager Raymond Thornton; Sales Manager Donald Eccleston; Vice-President Eric Herbertson; Executive Vice-President Firmin Reed. . . .

E. R. HERBERTSON
Vice-President
Arnold Hoffman & Co., Inc.
Providence, R.I.

Additives Education

TO THE EDITOR: I am sure that all too often, letters from readers are full of complaints. In contrast I would like to compliment you for "Viewpoint" (*Feb. 25, p. 5*).

We certainly need more articles like yours that will reach both the scientifically trained and the lay consumer of food to properly educate him on the advantages of chemical additives and pesticides after, of course, proper testing of the materials has been made.

A. R. CONANT
Engineering Chemicals Sales
The Dow Chemical Co.
Midland, Mich.

Rubber Workers' Wages

TO THE EDITOR: I enjoyed reading your article "Prelude to Labor's Big Push in '62" (*March 18, p. 49*). However, I feel your chart listing the wage settlements since the Presidential election is misleading so far as our settlement with URW is concerned. The 18¢/hour figure as quoted was not effective in its entirety in '61 but represents the sum total of the automatic adjustments that will be made over a 35-month period.

DONALD E. KULLANDER
Manager of Industrial Relations
Hewitt-Robins Inc.
Stamford, Conn.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

MEETINGS

U.S. Chamber of Commerce, 49th annual meeting, Washington, D.C., April 30, May 1-3.

Electrochemical Society, spring meeting, Claypool Hotel, Indianapolis, April 30-May 4.

American Zinc Institute, 43rd annual meeting, Drake Hotel, Chicago, May 1-2.

Lead Industries Assn., 33rd annual meeting, Drake Hotel, Chicago, May 2-3.

Sugar Industry Technicians, Inc., 20th annual meeting, Sheraton-Atlantic Hotel, New York, May 7-9.

Institute of Food Technologists, 21st annual convention, Hotel Statler Hilton, New York, May 7-11.

Technical Assn. of the Pulp and Paper Industry (TAPPI), annual coating conference, Statler Hilton Hotel, Buffalo, N.Y., May 8-10.

Metallurgical Society of American Institute of Mining, Metallurgical and Petroleum Engineers, first conference on "Management of Materials Research," Arden House, Harriman, N.Y., May 17-19.

Pacific Northwest Society for Paint Technology, annual symposium, Georgia Hotel, Vancouver, B.C., Can., May 26-27.

Air Pollution Control Assn., 54th annual meeting, Hotel Commodore, New York, June 11-15.

WHAT REFINERS SHOULD EXPECT FROM ANTIKNOCK SUPPLIERS... NOW, AND IN THE FUTURE

Today's gasoline is a mixture of many hydrocarbons and it is also a blend of many important decisions on the part of the refiner.

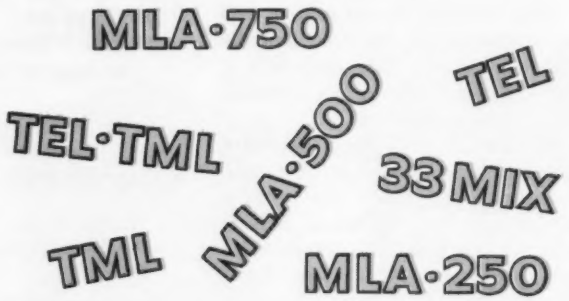
One important decision today is how to bring into agreement four factors—fuel composition, car population requirements, the best antiknock for a specific fuel and marketing objectives—to produce the most satisfactory and most profitable fuel.

The solution to the problem of matching fuel composition and antiknock is a complex one but, at the same time, one that can be rewarding in terms of better road performance at the same or less cost. Essentially it involves the optimum allocation of components and the blending of the right antiknock in the right concentration.

The selection of the antiknock is vital for it can contribute to the correction of an antiknock deficiency in a fuel, such as unsatisfactory motor octane and/or road performance, and at the same time reduce costs.

Changes in engine design and engine size are changing the octane requirement of the car population. Especially do foreign and compact cars have their own peculiar demands for fuel that will operate them satisfactorily at an economical cost.

Because there are so many factors that must be taken into consideration, the problem becomes quite complex. It is here that the antiknock supplier should be in a position to help in arriving at the best possible solution. That is why Ethyl is now even more actively engaged than ever in a program that will enable us to assist refiners in finding their own individual answers to: "Which antiknock—*exactly*."



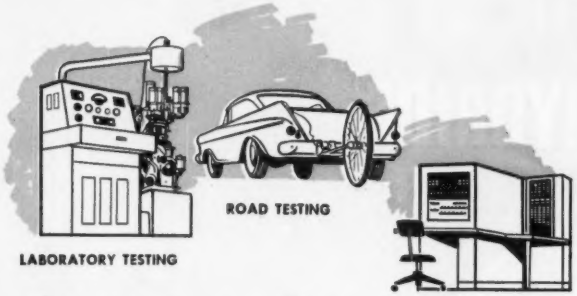
No single antiknock enough

In prior years, changes in fuels and fuel-engine relationships were met satisfactorily by changes in the formulation of the one antiknock compound universally used by the oil industry.

Today, however, because the hydrocarbon composition of components varies from company to company—and even between refineries in a single company—no one antiknock can any longer be best for the whole industry or even for a single company. Therefore, to meet

ETHYL
ANTIKNOCK COMPOUND
ETHYL CORPORATION

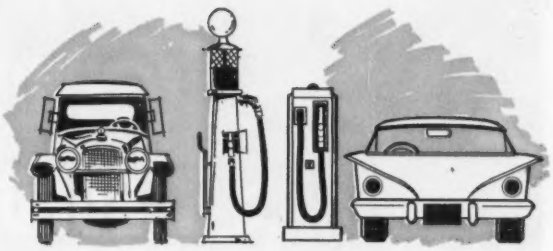
the industry's needs, Ethyl is now offering a number of antiknock compounds.



Ethyl takes action

To assist refiners in the selection of the antiknocks best suited to their needs, Ethyl has broadened its long-term program of matching fuels and antiknocks. A number of antiknocks, and combinations of antiknocks, are being tested in hundreds of gasoline blends from many refiners. These tests are for both laboratory and road rating and will be related to cost effectiveness. This project will produce a wealth of timely information for the individual refiner.

From this information it will be possible to make precise selection of an antiknock to insure optimum processing balance and minimum refining costs. In addition, an antiknock thus selected might well supply a refiner with an exclusive and promotable benefit that can be invaluable in the marketing function.



No substitute for experience

Long experience in the technology of antiknocks is necessary for the development of new antiknocks and their manufacture. Knowledge of the manufacture of one antiknock does not necessarily mean the knowledge required for the manufacture of another. While there may be surface similarities, there are often significant differences.

It is also experience that is the necessary ingredient in holding costs down. The successful, economical production of a finished product results from a complete know-how of the many processes involved and their economical operation.

Ethyl, with its 37 years' experience in this field, feels that it is especially suited to be of invaluable assistance to any refiner, regardless of size, who is facing the problem of: "Which antiknock for *us*!"

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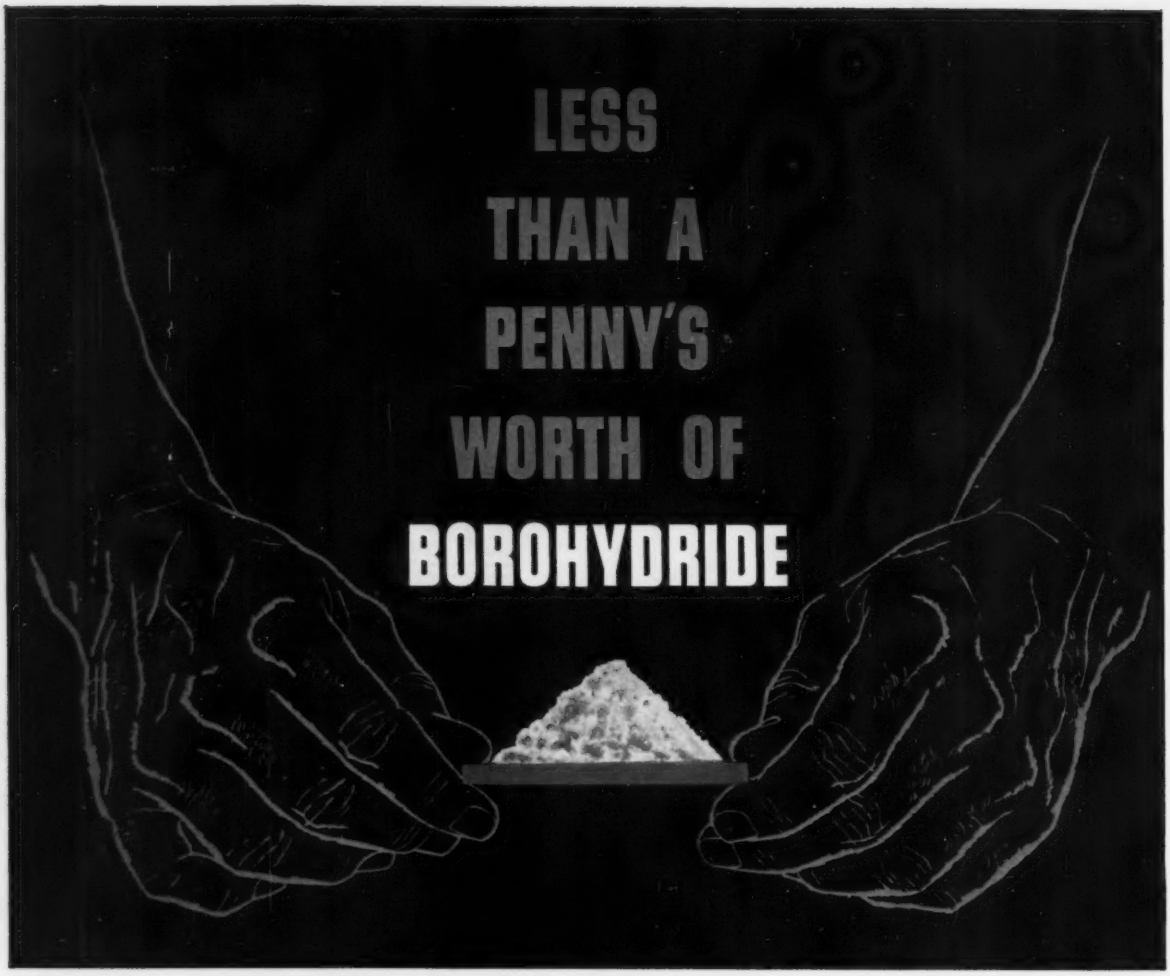

will "clean up" unwanted aldehydes, ketones, peroxides from a pound of product!

Now, with either MHI sodium borohydride or potassium borohydride it is possible to "clean up" minor amounts (0.5% or less) of these unwanted contaminants effectively by simple contact methods.

This will be especially welcome news if you are now faced with the difficult problem of catalytic hydrogenation, distillation, or complicated chemical treatment to remove residual aldehydes, ketones or peroxides from your product. This is of especial importance if you must maintain color stability in your organic products, if you are concerned with carbonyl poisons in organo-metallic polymerization systems, or if you wish to reduce and inhibit peroxides in ethers. The easy borohydride method adds less than a penny a pound to the material cost of your product and may save more than that in processing costs!

Here are specific products which should respond effectively to borohydride treatment:

- ALCOHOLS
- ESTERS AND POLYESTERS
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- NITRILES
- ETHERS AND POLYETHERS
- PENTAERYTHRITOL
- PEROXIDE CATALYZED POLYMERS
- CELLULOSE PULPS
- PEROXIDE BLEACHED ORGANIC MATERIALS *(waxes, etc.)*
- CHLORINATED HYDROCARBONS
- OXIDIZED HYDROCARBON STREAMS
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Complete information on MHI sodium borohydride and potassium borohydride is available without obligation. Write today!

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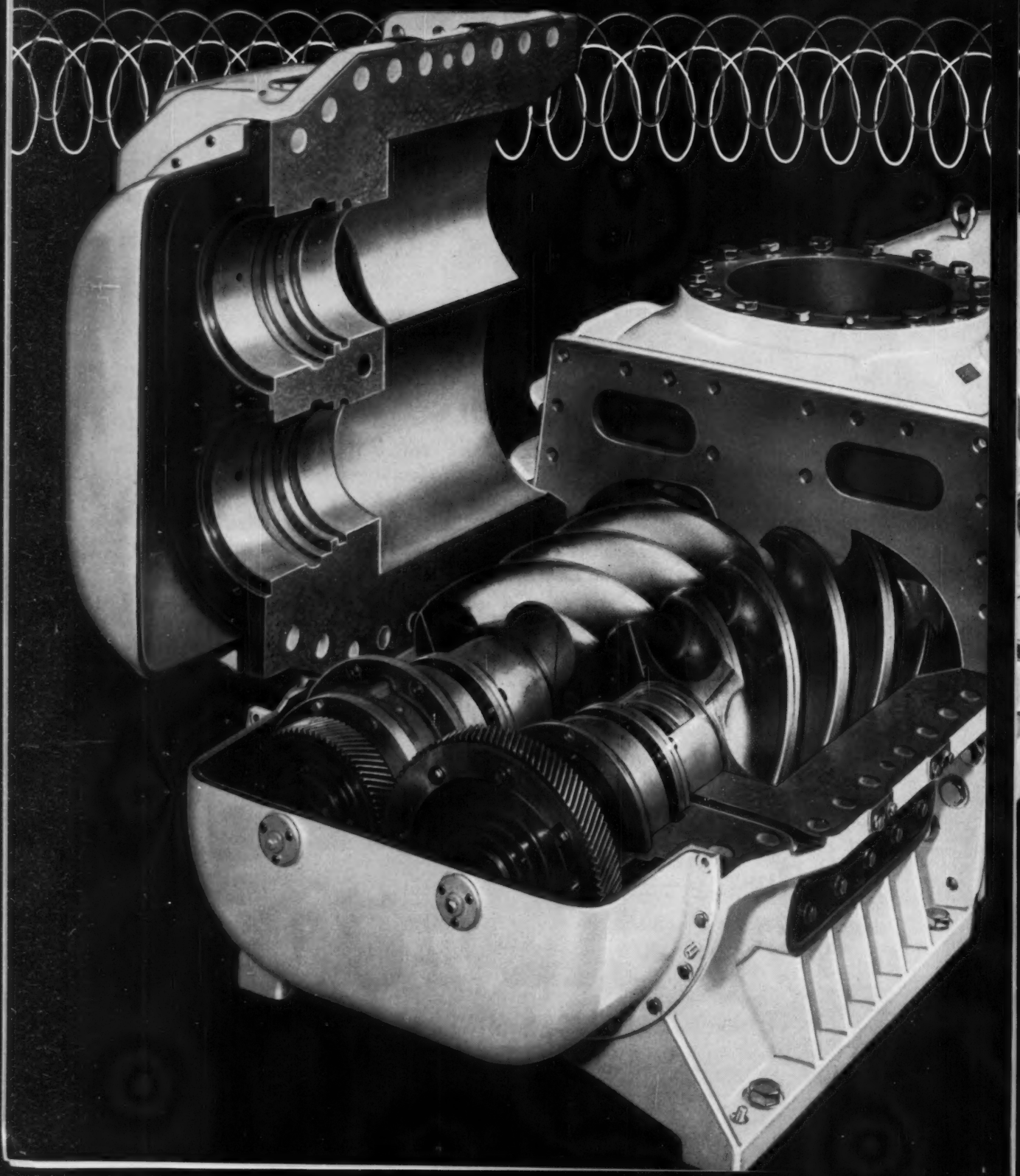

BECAUSE MECHANICAL SIMPLICITY MEANS FAR LESS COST!

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More and more, industrial leaders are looking-to (and buying) Fairbanks Morse leadership in Compressor design. Why? Because the unique, mechanical simplicity of this *rotary* design combines maximum efficiency and reliability with low initial cost—low maintenance requirements—minimum operating costs. *And skid-mounting* cuts installation time—puts you on stream faster.

The advanced design of the F-M Axial Flow Rotary Compressor features *helical-shaped* rotors for smooth, economical compression . . . with oil-free delivery, surge-free operation on a wide variety of gases.

F-M Rotary Compressors have no reciprocating parts, no valves, no metal-to-metal contact in the compression chamber. Result? Minimum "down-time" expense. They save space—produce minimum vibration—provide stable performance with speed flexibility. Every Rotary Compressor built features famous Fairbanks Morse quality craftsmanship.

With capacities up to 21,000 cfm—and pressures up to 250 psig, F-M Rotary Compressors are a versatile asset to many operations. Discover how it can step up the efficiency of *your* operation . . . and cut maintenance and installation costs as well. Write: **Fairbanks, Morse & Co., Director of Marketing, Compressor Division: Beloit, Wisconsin.**

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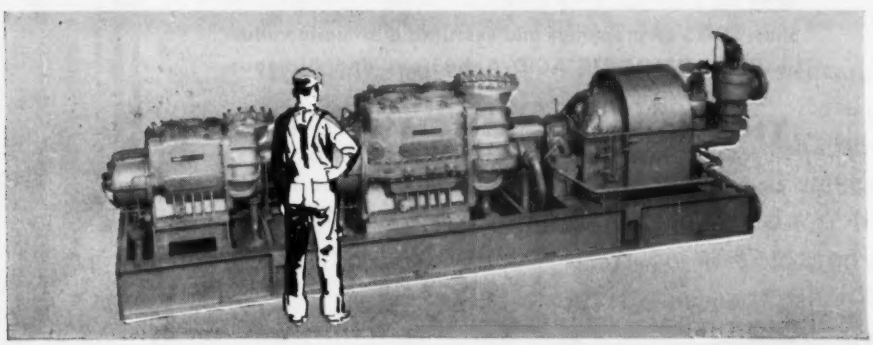

Skid-Mounted, Tandem Rotary Compressor ready for installation at Deere & Company, Waterloo Tractor Works.

Model 200L3/132L3 Fairbanks-Morse Rotary Air Compressor for 12,000 cfm, 110 psig. with 2600 h.p. steam turbine drive.

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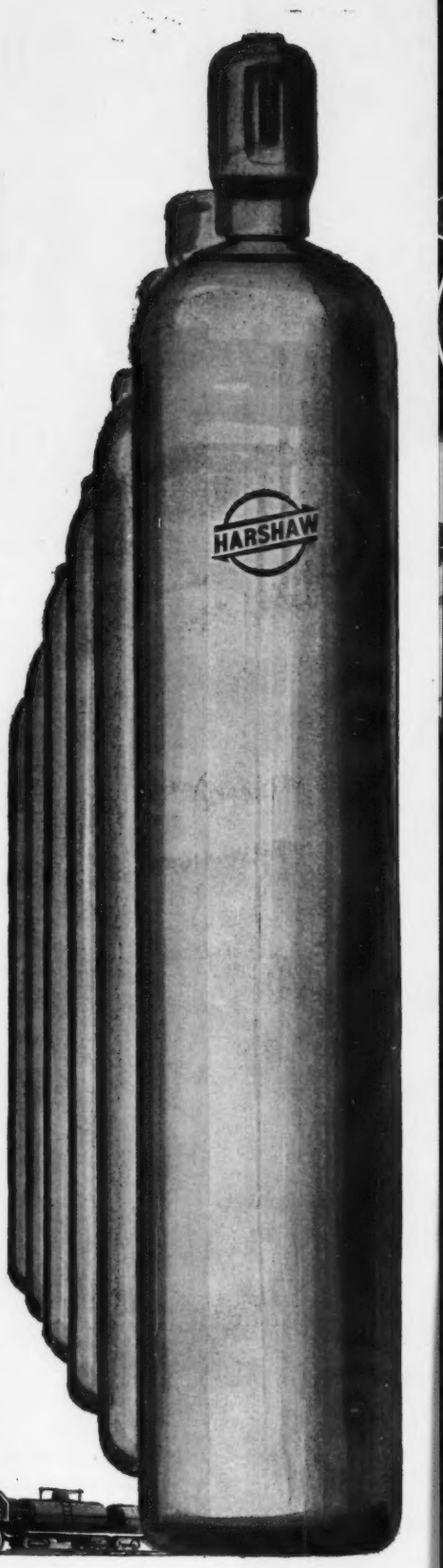

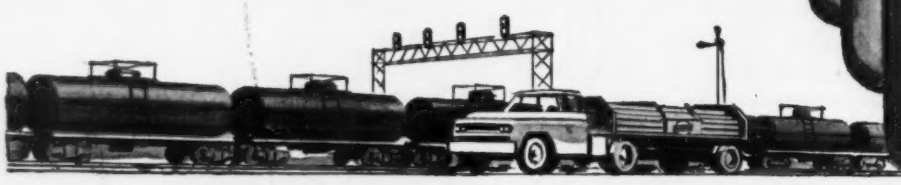

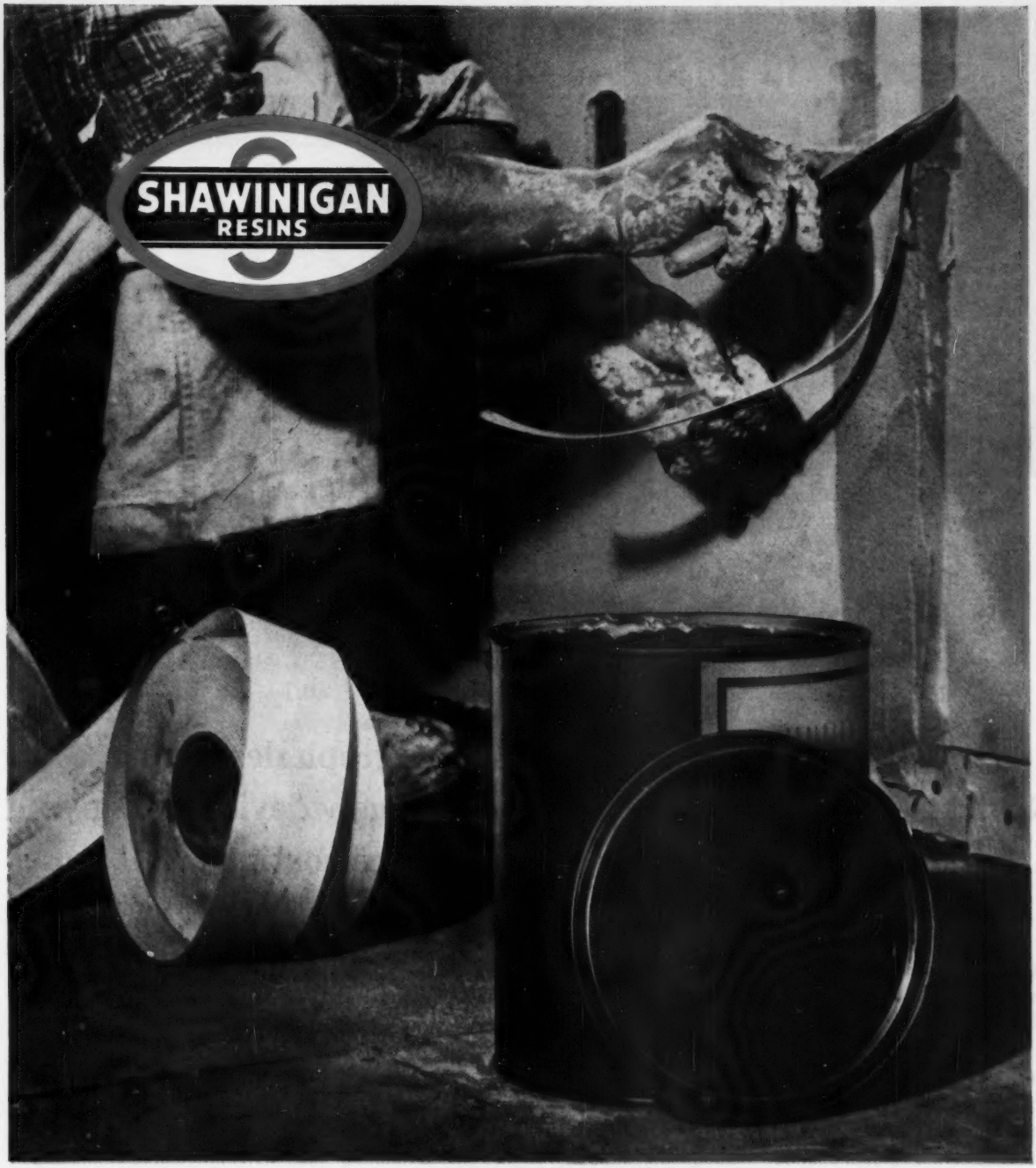

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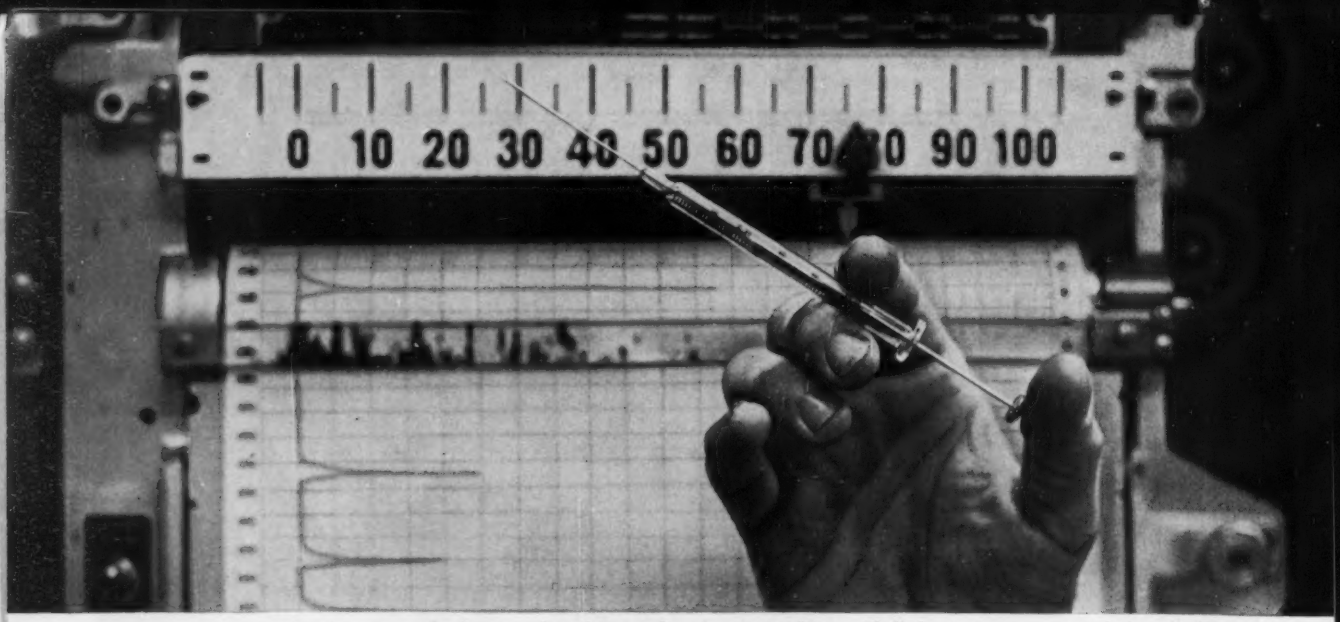
Shawinigan Resins Corporation, Springfield 1, Massachusetts



Gas chromatography does complex solvent analyses in minutes. Here, a Shell chemist prepares a sample for injection.

BULLETIN:

Shell Chemical announces a monograph describing 31 tests—some standard, some ingeniously devised—to give you greater insight into surface coatings.

Shell uses these 31 tests as a backbone in lacquer formulation. They have led to startling concepts such as *the advantages of solvent retention* and to remarkable new high boiling solvents such as Pent-Oxone* *keto-ether* and Pent-Oxol* glycol ether.

Read how you can get an indexed, 60-page copy of this monograph telling how to set up these 31 tests, how to run them and *how they can help improve your current formulations.*

THE 31 tests used regularly at Shell Chemical's Technical Service Laboratory in Union, N. J. have led to some fascinating new fields of investigation. One is solvent retention.

A twist on solvent retention

While slow solvent release is known to cause film shrinkage and have a bad effect on print resistance, *retained* solvent has recently been found to have *good* effects on gloss retention and restoration, cold crack resistance and weatherability.

Test 29 can help you study these dual effects in terms of *what actually happens when lacquer dries.*

Two remarkable new high boilers

Studies of this type led directly to Shell Chemical's two remarkable new high boilers: Pent-Oxone *keto-ether,* particularly promising in formulations with *dissimilar resins* and Pent-Oxol glycol ether for *maximum blush resistance/practical drying time* in nitrocellulose lacquer formulations.

How to get your monograph

To get your monograph, write or call any of the 9 district offices of Shell's Industrial Chemicals Division. Or write Shell Chemical Co., 110 W. 51 Street, New York 20, N.Y.

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Diacetone Alcohol	Methyl Amyl Acetate
Di-tertiary-butyl peroxide	Methyl Ethyl Ketone
	Methyl Isobutyl Carbinol
Ethyl Alcohol	Methyl Isobutyl Ketone
Ethyl Amyl Ketone	Neosol® Solvent
Glycerine	Pent-Oxone* Keto-ether
Hexylene Glycol	Pent-Oxol* Glycol Ether
Isopropyl Alcohol	Secondary Butyl Alcohol

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A Bulletin from

Shell Chemical Company

SHELL

Industrial Chemicals Division

Business
Newsletter

CHEMICAL WEEK
April 29, 1961

A tight hand on cash dividends. That was the apparent policy of chemical management, judging by a late report on dividend disbursements in first-quarter '61. Directors of chemical companies voted to pay out to stockholders a total of some $252.3 million. It's a hefty sum, but only a modest 1.4% increase over the 7.8% rate paid in the booming early months of '60.

For all U.S. business, by way of comparison, first-quarter '61 dividends inched up to a rate of 9.1% (for a total of about $3.43 billion) vs. 7.5% in the first three months of last year.

Outlook now is for increased payments to chemical investors during the second quarter. Reason: the economic upturn will bolster managements' resolve to bring cash dividends more in line with anticipated rising profit curves.

•

Tough sledding ahead for the President's tax program. One aspect that brought immediate fire from the financial community concerned the proposal to repeal the special tax treatment now given investors' dividends. This calls for repeal of the $50 exclusion and 4% credit on dividends received. (*For details of the message, see p. 24.*)

Rather than wipe out the tax break, New York Stock Exchange President Keith Funston urges Congress to lift the dividend income credit to 10%, and double the exclusion to $100.

Edward McCormick, president of the American Stock Exchange, calls the tax proposal "unfair and inequitable."

•

A triple play for new oxo-alcohol capacity. Reichhold Chemicals has contracted with Air Products for the bulk of output of a new plant that will be built by Tidewater Oil adjacent to the latter's giant Delaware City, Del., refinery.

Tidewater will provide raw materials and operate the projected 60-million-lbs.-plus plant; Air Products will provide design engineering and handle sales of the isooctyl, decyl and tridecyl alcohols and other products to be produced there. Need for the additional material, says Reichhold, has been brought about by a doubling in plasticizers manufacture by its Deecy Products Division.

Also in the works: RCI plans to expand plasticizer capacity at its sprawling Detroit works, and at some of its plants in California and on the East Coast.

•

It's a deeper plunge into aromatic chemicals for Pure Oil. The company will go ahead with a BTX unit at its Lemont, Ill., refinery.

Capacity will be 26 million gal./year, with completion slated

for November this year. Universal Oil Products' Procon, Inc., division will build the addition.

Earlier this year, Pure Oil and Atlantic Refining set up a 50-50 venture to turn out 50 million gal./year of BTX at Pure's Nederland, Tex., refinery (*CW Business Newsletter, Jan. 28*). Startup of that unit too is scheduled for late-'61.

Nothing official on this yet, but Pure Oil may also soon reveal plans for adding hexane and heptane capacity to the Lemont BTX unit. The company is giving these projects serious study.

•

Big question in the industry this week. Will Chas. Pfizer acquire New England Lime? Despite published reports of such a deal, Pfizer says "there is no information" available. The New England company tells *CW* that talks have been going on with Pfizer but that "nothing definite has developed." Reportedly, Pfizer's interest in New England Lime centers on the latter's high-purity lime, a product essential in processing citric acid. Pfizer is a major citric acid producer.

•

Nalco Chemical Co. (Chicago) officially disclosed this week it is considering production of tetraethyl lead and tetramethyl lead (*CW Business Newsletter, March 11*). The firm says that output of those compounds would be at a rate sufficient to consume 26 million lbs./year of lead. Nalco says it will use a new company-developed process, with a Gulf Coast plant location contemplated.

•

A new petrochemical complex for Sweden gets under way. Esso Svenska, A.B., has awarded Fluor Corp. Ltd. a $15-million contract for engineering and building a steam cracking plant at Stenungsund. New ethylene and butadiene facilities will be completed before July '63, serve as the nucleus for a complex that will turn out polyethylene, ethylene oxide-glycol, other petrochemicals.

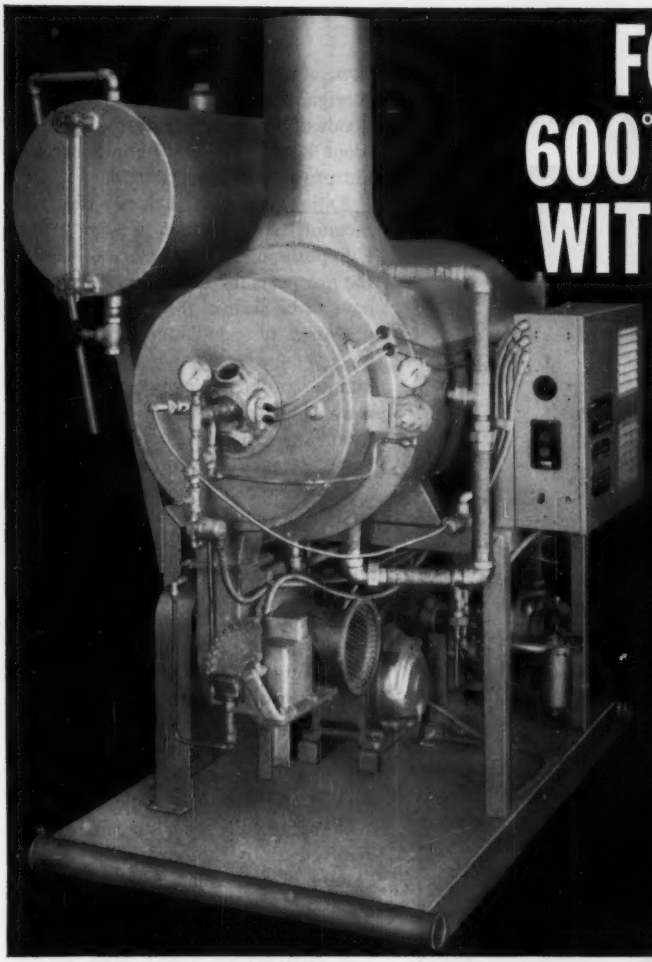
•

Cheerful comments on improved business in March and April continue to offset gloomy data on first-quarter earnings.

From Union Carbide's Chairman Morse Dial: an expectation that increasingly brisk operations since February will lead to "satisfactory" sales and earnings for '61 as a whole. UC's first-quarter sales slipped 7.8%, to $364.3 million; earnings were down 19.9%, to $33.7 million.

Allied Chemical's Chairman Kerby Fisk tells of "marked improvement in most areas of the company's business," starting in March and continuing into April. Allied's first-quarter sales were off 8.4%, to $168.6 million; earnings were down 29.8%, to $9.5 million.

Diamond Alkali's Chairman Raymond Evans says he's encouraged by the "gradual improvement" during the first quarter. His company's sales were down 5.1% to $31.3 million, and earnings dropped 26.9%, to $2.1 million.



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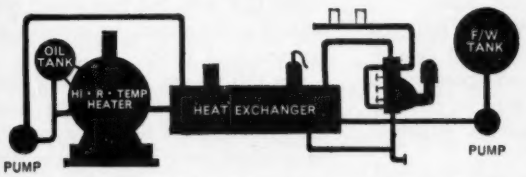

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WIDE WORLD

Mexican students reflect Latin American reaction to Cuban invasion.

Loser: U.S. Business

By the end of last week the rebel assault on Cuba appeared to have failed. Although the struggle for the little island may not be finished, as many insurgents aver, one fact is starkly clear: the week's events added up to the biggest international setback the U.S. has had in years. For the U.S. chemical industries, it means even more problems in Latin America, and probably elsewhere in the world.

The apparent failure of the invasion was a blow to the U.S.; in the eyes of the world the U.S. encouraged and supported it. Almost universally the struggle for Cuba is seen as a battle between Fidel Castro, backed by Nikita Khrushchev, on one side, and the U.S.-aided rebels on the other.

Reactions in Latin America followed a predictable pattern: student demonstrations, anti-American speeches by politicians and labor leaders, physical assaults on U.S. business establishments.

By becoming identified with the anti-Castro assault, the U.S. stirred up all the deep-rooted hatred of "Big Brother" strong-arm tactics in Latin America. The leaders of Brazil and Venezuela felt bound to make public declarations against outside intervention; at the UN, Mexico condemned foreign interference in Cuba. Whatever goodwill had been engendered by President Kennedy's new Latin-American aid program seemed soured.

Latin American Crises: The full meaning of this loss in prestige to the U.S. position in Latin America—and to the prospects for U.S. business there—have to be seen in the long view. The pressures of population growth and poverty and the examples of Communist progress elsewhere in the world have produced a popular determination that Latin America's economic stagnation must end.

Moderate leaders are trying to guide this social tide within the channels of democracy. Any upsurge in anti-Yankee feelings strengthens the radical forces who seek a different "solution."

And with the Communists losing no opportunity to exploit the "aggressor" label it has pinned on the U.S., our position against outside intervention in places like Laos and the Congo has been seriously weakened in the eyes of the neutralist nations.

Probably fully as damaging as our involvement is the invasion's failure. Failure of the counterrevolution, one U.S. official warned last week, "would be little short of a disaster for the U.S. Khrushchev could paint us as being both wicked and weak. And the latter charge would hurt us around the world."

Beggar's Choice: If the counterrevolution is definitely crushed, the U.S. will have taken all losses and no gains. Its prestige will have been tarnished, Khrushchev's enhanced, Castro's grip on Cuba strengthened and his influence throughout Latin America magnified.

A rebel victory, some U.S. officials believe, could have the opposite effect. There would continue to be criticisms of the U.S. role, but they would evaporate if a democratic, progressive government took over.

For this reason, some highly placed Administration officials were urging the President not to let the rebellion be crushed, even if this means direct intervention. At week's end, Kennedy was still trying to keep U.S. involvement at a minimum, hoping the rebels would still succeed. But in his dramatic — and ambiguous — speech Thursday, he left the way open to intervention.

Setting a Course for CPI Growth

Steadily rising budgets—for capital spending, research, and marketing of new products—is the outlook for the years '61-'64.

A clear and detailed picture of the CPI drawing up growth-directed budgets at least three years in advance is contained in the 14th annual McGraw-Hill survey—distributed this week—of business's plans for new plants and equipment. Over-all, the survey shows that U.S. business now plans to put $35.35 billion into capital investments this year—only 1% less than in '60, and 21% more than the '50-'59 average. In preliminary planning for '62-'64, capital budgets are already shaping up at approximately the same size: $33-35 billion.

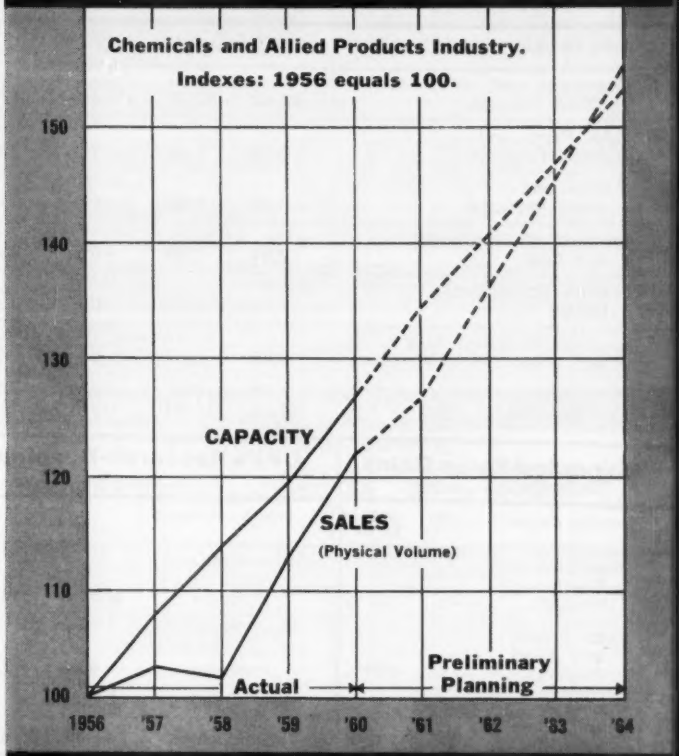
CPI companies—radiating only slightly more business confidence than last fall when business was generally on the downgrade—expect a modest 3-4% increase in sales this year. But by '64, most of them say, physical sales volume will climb an additional 18-23%. More bearish on this score are the petroleum refiners and other producers of oil and coal products; they are counting on a 3% sales gain this year, but look for an additional increase of only about 11% by '64.

Profits Still Sagging: Within the CPI, only nonferrous metals companies seem to anticipate any significant improvement in earnings this year. Other process industries indicate that '61 profits will be about the same as last year's, perhaps lower.

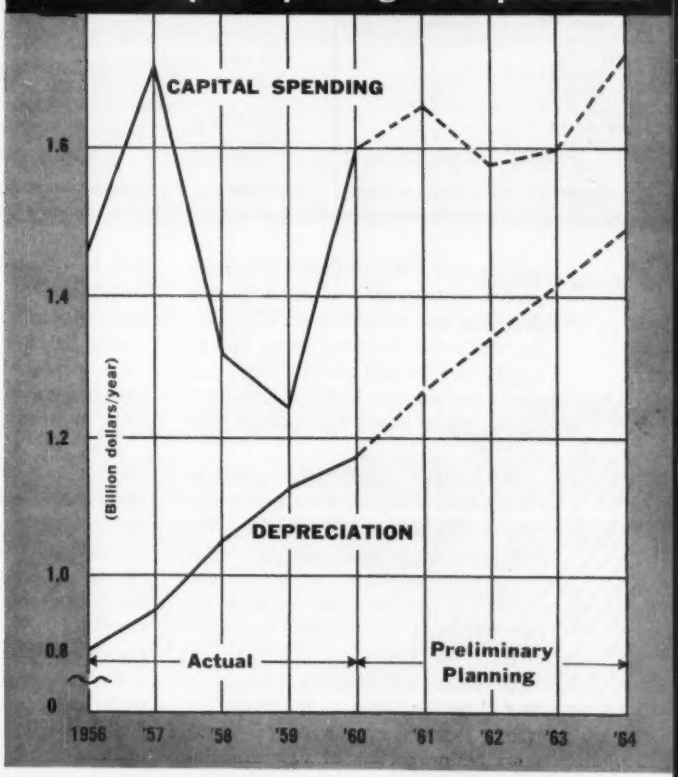
But the survey brings out lively hopes in nearly every industry for a marked upswing in profit margins over the next three years. Although managers expect to maintain capital spending on a high plateau throughout this period, they are earmarking more money for modernization and less for the building of new capacity. Result: sales volume would increase more rapidly than total capacity, leading to higher operating rates and firmer prices—which together could have a most exhilarating effect on earnings.

Banking on New Products: A closer look at what this could mean in the chemical industry requires consideration of another factor: prospects for new products. In the McGraw-Hill survey made four years

Capacity vs. Sales: Sellers' Market Ahead?



Chemical Capital Spending vs. Depreciation



CPI's Capital Spending Plans

(billion dollars)

Industry Category	1960 Actual	1961 Planned	% Change '60 to '61	Preliminary Plans '62	'63	'64
Chemicals and Allied Products	$1.60	$1.66	+4%	$1.58	$1.60	$1.74
Pulp, Paper and Allied Products	0.75	0.68	−9%	0.60	0.61	0.62
Rubber and Allied Products	0.23	0.22	−6%	0.23	0.24	0.24
Products of Petroleum and Coal	2.64	2.85	+8%	2.88	2.82	2.88
Primary Nonferrous Metals	0.31	0.31	0%	0.35	0.41	0.46
Products of Stone, Clay and Glass	0.62	0.59	−5%	0.55	0.55	0.53
CPI Totals	6.15	6.31	+3%	6.19	6.23	6.47
ALL MANUFACTURING	14.48	14.09	−3%	13.92	13.60	13.71

Expected Sales Gains

(Physical volume)

Industry Category	1960 to '61	1961 to '64
Chemicals and Allied Products	+4%	+22%
Pulp, Paper and Allied Products	+7%	+20%
Rubber and Allied Products	+4%	+18%
Products of Petroleum and Coal	+3%	+11%
Primary Nonferrous Metals	+3%	+23%
Products of Stone, Clay and Glass	+2%	+22%
ALL MFG.	+3%	+20%

CPI's Research-Development Outlays

(million dollars)

Industry Category	ACTUAL 1959	'60	PLANNED '61	'64
Chemicals and Allied Products	$661.8	$741.2	$785.7	$919.3
Pulp, Paper and Allied Products	63.4	69.1	75.3	93.4
Rubber and Allied Products	89.3	89.3	93.8	108.8
Petroleum Products	300.7	309.7	319.0	338.1
Primary Metals	138.1	143.6	153.7	175.2
Products of Stone, Clay and Glass	73.6	86.1	90.4	111.2
ALL MFG.	8,656.4	9,355.4	9,995.6	11,113.6

ago, chemical companies said they expected to expand total capacity 9% that year and an additional 22% during the three following years, for an aggregate four-year gain of 33%; and they expected that in the fourth year, new products would account for 16% of sales.

But in this new survey, makers of chemicals and allied products say they intend to increase capacity only 6% this year and an additional 14% over the next three years, for a total rise of 21%; and they are banking on new products to account for 20% of their '64 sales.

Thus chemical industry capacity is now slated to increase more moderately than in some past years, and a greater proportion of new capacity will be devoted to new products—at least some of which will not be in competition with existing chemicals. Using '60 as a base, the projected 21% increase in chemical capacity is expected to be overshadowed by a 27% boost in chemical sales.

Less Idle Capacity: If the '61-'64 period develops along those lines, there should be a continuing improvement in the chemical industry's average operating rate, which—at the end of '60—was only 75% of capacity. Chemical company executives say their idea of a desirable operating rate would be 93% of capacity.

Similar improvements are anticipated in other process industries. Companies specializing in primary smelting and refining of nonferrous metals —which at year-end were operating at only 72% of capacity—expect a 12.2% increase in capacity by '64 to be outweighed by a 26.8% rise in sales. Pulp and paper producers think they have even better grounds for optimism: at 88% of capacity, their year-end operating rate was higher than that of any other manufacturing industry; and on top of this, they are looking for four-year increases of 28.4% in sales and only 13.4% in capacity.

Makers of stone, clay and glass products report an average operating rate of only 70% of capacity; but winter is, of course, normally a slack season for building materials. These companies are projecting a 14.4% increase in capacity by '64, but think their physical sales volume will be up 24.3% over last year's level. Processors of petroleum and coal—whose plants were running at 81% of capacity at year-end—anticipate only a 14.2% rise in sales; but this could materially boost operating rates, because these companies are planning only a 6% expansion in plant capacity. Rubber companies were operating at 76% of capacity at year-end; they're planning on a 15.4% capacity increase by '64 and a 22.8% sales gain.

All-manufacturing-industry totals: year-end operating rate, 77% of capacity; planned increase in capacity by '64, 14.3%; projected increase in physical sales volume by '64, 23.7%.

Banking on Research: The chemical industry is spending $123 million this year for new research facilities—a larger outlay than that of any other manufacturing industry. In '61 research and development operating budgets, the chemical industry ranks third with allocations totaling $758.7 million—about 2.7% of projected sales. Only about 3% of the chemical industry's R&D work is aimed at military products; the two industries with higher R&D budget totals—aircraft and parts, $3.72 billion; electrical equipment, $2.44 billion—devote 91% and 30% of their research attention, respectively, to military products.

Although chemical companies are investing heavily in research relative to sales and are relying on new products for above-average proportions of future sales, they have a comparatively long wait for their research to bear fruit. Among the chemical companies

surveyed, 33% say they expect research to pay off within three years; 41% put the figure at four to five years; and the other 26% don't expect returns for six years or more. In contrast, 55% of all manufacturing companies surveyed expect their research to pay off within three years, while only 11% see a six-year wait.

Laboratory construction and equipment investments planned by other process industries this year: petroleum and coal products, $26 million; pulp and paper products, $19 million; stone, clay and glass products, $17 million; nonferrous metals, $16 million; rubber products, $15 million. Concentration on commercial (nonmilitary) products ranges from 91% (rubber products) to 100% (pulp and paper products). Fifty percent of the petroleum and coal processors expect to wait six years or more for their research to pay off, but 64% of the nonferrous metals producers put their payoff periods at three years or less.

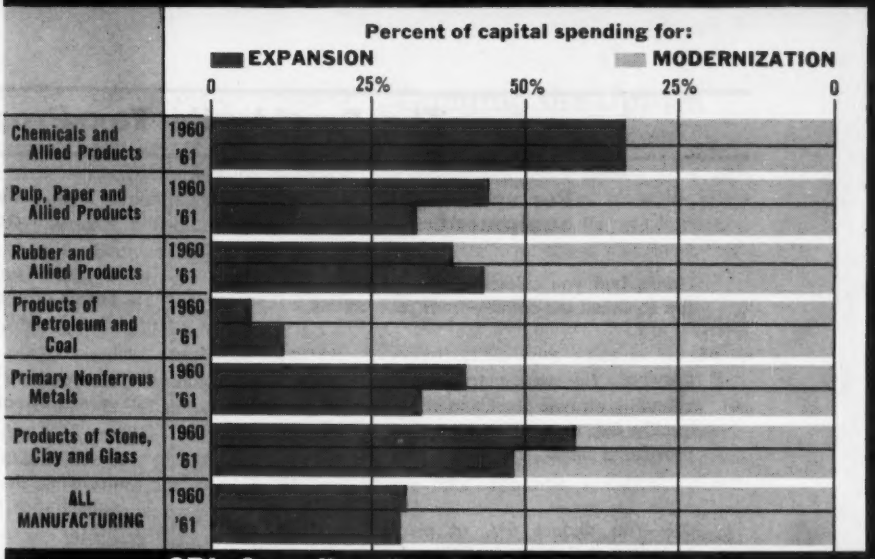
Business as a whole expects its depreciation allowances to increase 8% this year, with total cash flow—depreciation plus earnings—to go up 9%. Chemical companies expect a 9% rise in both categories, implying no increase in net income this year.

The survey—made by McGraw-Hill's Dept. of Economics—is based on companies' replies to a questionnaire received in March and early April and thus represents management's thinking at that time. Companies responding in the survey employ more than 50% of all workers in those industries where capital investment is highest.

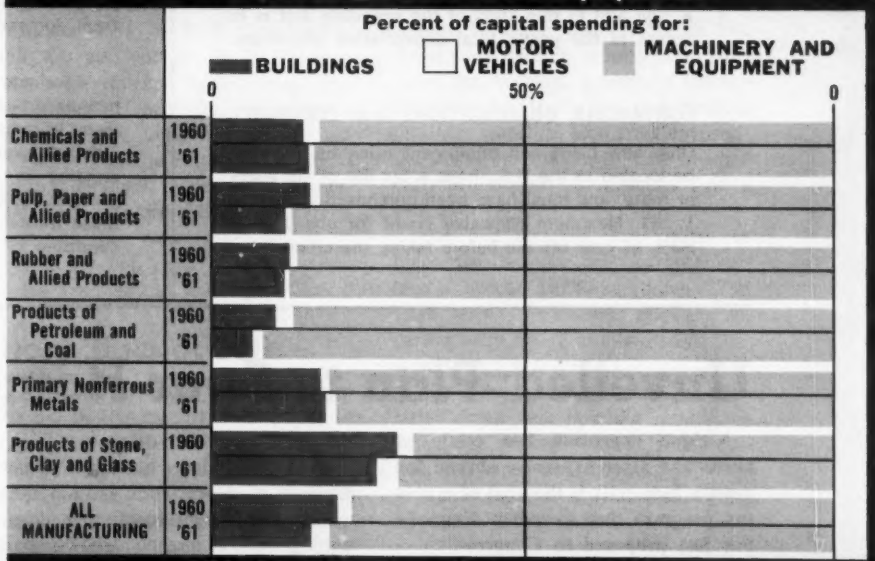
The fairly steady increases in CPI capital spending and research budgets now postulated for the next few years are pretty much in line with what these companies were planning a year ago (when business was booming) and six months ago (when business was drooping toward last November's lows.) This suggests that management has settled on an approximately 5%/-year growth rate and—unless something bigger than the '60-'61 recession happens to the economy—intends to stick closely to that program.

New England states: Me., Vt., N.H., Conn., R.I., Mass. South Atlantic states: Del., Md., W.Va., N.C., Ga., Fla., S.C., Va., D. of C. North Central states: O., Mich., Ind., Ill., Wis., Minn., Ia., Mo., N.D., S.D., Neb., Kan. South Central and Southwest states: Tex., Okla., Ark., La., Ky., Tenn., Miss., Ala. Western states: Wash., Ore., Calif., Mont., Ida., Wyo., Nev., Colo., Utah, Ariz., N.M. Middle Atlantic states: N.Y., N.J., Pa.

Chemical Companies — Tops for New Capacity



CPI: Spending Heavier for Equipment



CPI Capital Spending by Regions

The President's Tax Proposals

. . . For spurring plant and equipment spending

Here's how you calculate the amount to deduct—the so-called tax credit—from your tax bill.

EITHER—You deduct 10% of the first $5,000 of spending on new plant and equipment, if you don't qualify for, or can't gain as much with, the two provisions below. . .

OR—You deduct 6% of plant and equipment spending that exceeds 50% of your depreciation allowance, up to 100% of such allowance.
• You add to this 15% of the spending that is in excess of the year's total depreciation allowance.

LIMITATIONS, QUALIFICATIONS AND ELIGIBILITY

Only new plant and equipment qualifies. It must be located in the U.S., have a tax life of six years or more, and must have been purchased after Jan. 1, '61. Maximum allowable credit for one year is 30% of your tax bill before taking the credit.

. . . For limiting investment in advanced nations

1—Eliminate privilege of deferring U.S. taxes on profits of subsidiaries in industrialized nations and "tax haven" privileges in all nations.

2—Continue tax deferral privileges for income earned by subsidiaries in underdeveloped countries.

3—Eliminate tax deferral privileges for all sales, licensing, insurance, and similar nonmanufacturing subsidiaries in any country.

4—Tax the income from foreign investment companies in "substantially the same way" as income from domestic investment firms is taxed.

5—Eliminate or restrict tax exemption privileges now accorded earned income of American citizens living in industrialized countries; allow a maximum $20,000 exemption on earned income of those residing in less developed countries; terminate present $20,000 exemption on earned income for those travelling (but not residing) in industrialized countries 17 out of 18 months.

Unveiled: Plan to Spur Home Spending

Making expansion less costly at home and more expensive abroad for growth industries is the goal of a new tax program that President Kennedy has just proposed to Congress.

The Administration hopes that additional plant and equipment spending of $2-$3 billion/year will be sparked by a formula (*table, above*) that would permit rapidly expanding companies to decrease their federal tax payment in a given year by as much as 30%.

The President himself made the decision to recommend the tax credit method—proposed by Assistant Secretary of the Treasury Stanley S. Surrey—instead of proposing further liberalization of depreciation allowances (*CW Depreciation Report, March 25, p. 111*).

Studying Depreciation: Kennedy said in his message to Congress that more rapid depreciation shares some of the advantages of the tax credit proposal, but he finds the investment tax credit scheme "superior, in my view, for a number of reasons."

In the first place, he says, "proper methods of depreciation have a normal and important function in determining taxable income, wholly apart from any considerations of incentive. . . . It may be that on examination some of the existing depreciation rules will be found to be outmoded and inequitable; but that is a question that should be separated from investment incentive." A review of depreciation is under way at the Treasury, the President says, and "adoption of the proposed incentive credit would in no way foreclose later action on these aspects of depreciation."

As Kennedy views it, depreciation allowances tend to raise current costs and "act as a deterrent to price reduction," whereas the investment credit does not. The investment credit, he adds, induces more new investment for the same revenue loss to the Treasury.

Pro-Tax-Credit Bloc: Kennedy's support for the tax credit idea is a clear victory for Assistant Secretary Surrey. His detailed position on a wide range of controversial tax matters was seized on by members of the Senate Finance Committee who held up a vote on his confirmation until they got a letter from Treasury Secretary C. Douglas Dillon stating that Surrey was not the maker of tax policy for the Administration, but only one of many advisors in this field.

Besides Surrey, the Council of Economic Advisors, headed by tax specialist Walter Heller, also favors the tax credit approach. But there are other Administration officials and many conservative legislators in Congress who favor increased liberalization of depreciation—and they will fight for approval of some depreciation method.

Blasted as 'Subsidy': Sen. George Smathers (D., Fla.), a member of the tax-writing Senate Finance Committee, has blasted the tax credit approach, called it "a type of subsidy that will surely be attacked on that

ground. . . . Its very nature makes it so vulnerable to the charge that it is a handout or a giveaway that no reliance can be placed on its continuance." He wants to give all investment a five-year write-off.

Other congressmen and senators, including many on the tax-writing House Ways and Means Committee, which will hold first hearings on the proposal, also prefer liberalized depreciation.

In addition, the tax credit plan will almost surely be criticized by Walter Reuther, United Auto Workers chief, and other labor leaders. They take the position that there is no need for incentives to boost plant capacity at a time when so much capacity is idle for lack of consumer demand. So they and their supporters in Congress will attempt to tie some kind of tax break for the consumer onto any bill that has a tax incentive for business.

Yank, Come Home: Kennedy's proposals for cutting back the tax advantages of U.S. companies operating in industrialized countries are sharper than had been expected. He goes along with those critics who contend that the overseas tax provisions have resulted in huge sums being reinvested by subsidiaries of U.S. firms in such countries as Germany and Japan, which then compete with the U.S. both in the U.S. and third markets.

The critics say that U.S. law now permits these overseas earnings to be untaxed—either permanently or over a given period of years—and that this amounts to "an interest-free loan from the U.S. treasury," which they want stopped. Kennedy also wants to end the tax privileges "for forms of activities such as trading, licensing, insurance, and others"—the so-called "tax havens."

Getting More from Oil

Britain is filling out its petrochemical industry. Newly slated for construction: phthalic anhydride, maleic anhydride, olefins, ethylene, propylene and butadiene plants.

Imperial Chemical Industries Ltd. will use a new process—air-oxidation of butene—in a 10,000-long tons/year maleic anhydride plant to be built at Tees-Side.

The first plant in Britain to make phthalic anhydride from petroleum will be built by Grange Chemicals Ltd., joint subsidiary of British Hydrocarbon Chemicals Ltd. and California Chemical Co. (BHC, in turn, is owned by British Petroleum and Distillers Co. Ltd.; and California Chemical is owned by Standard Oil of California.) The 15,000-long tons/year plant will be based on *o*-xylene feed. The bulk of its output will go to Distillers Co. plastics plants. Probable location: Grangemouth, Scotland.

Another BHC petrochemical complex will go up at Baglan Bay, South Wales. The first plants, which will go onstream about the end of '62, will produce ethylene, propylene and butadiene. Distillers Co. will again take part of the output for plastics production. British Geon—owned 55% by Distillers, 45% by B. F. Goodrich—will use ethylene in its 40,000-long tons/year polyvinyl chloride plant (being increased to 70,000 long tons/year) at Barry, South Wales.

The rest of the ethylene will go to Forth Chemicals, owned by Monsanto and BHC, which will make styrene monomer for conversion into polystyrene by two other Distillers associates, Distrene Ltd. and B. X. Plastics.

Italy Shies at TML

An effort is being made to block the use of tetramethyl lead (TML) as a gasoline additive in Italy. Charging that fumes from gasoline made with TML contain 70 to 100 times as much lead as the fumes of gasoline containing tetraethyl lead (TEL), Italian Senator Luigi Preti has asked the Italian Minister of Health, Camilo Giardina, to withdraw authorization for use of the additive.

TML has been widely expected to capture the entire European antiknock market by '63 (*CW, Feb. 4, p. 22*). The additive's greater volatility, which is the basis of charges that it is more hazardous, helps in distributing it more evenly among the engine's cylinders. Getting this even distribution is a particular problem with small European cars.

Mobiloil Italiana is selling gasoline containing TML, and Esso Standard Italiana plans to do so soon. Both companies, in a joint statement, argue that the skin penetrability of TML is only one-tenth that of TEL, so the increased volatility isn't of significance to human beings.

Gauging the Upturn

American-Marietta Co. (Chicago)—which last week started up a new resins and adhesives plant at Richmond, Calif.—says its own economic barometer now points to a brisk business upturn for the whole United States economy.

Adding weight to A-M's prediction, based on its sales gains in March, is the company's broadly diversified line, which reflects many aspects of the economy. Products include construction materials, industrial finishes, printing inks, dyestuffs, household chemical specialties, synthetic resins, refractories, metal powders and alloys.

A-M's March net income was 37% above that of a year ago, on sales that were 12% better than in March '60. Paint sales were up, printing inks stayed at the '60 level, household specialties showed a sizable rise, and chemical products were up. Construction product sales—held down by bad weather early in the year—were higher than a year ago.

The bad weather was largely to blame for the poor first-quarter showing: a net of $824,884, down 77% from '60's $3.56 million. Sales for the period were $64.3 million, down 9% from '60's $70.9 million.

The company is optimistic, particularly about its building materials, which are getting a boost from highway and other public works projects. It is continuing to expand in this field, by plant building and acquisition.

American-Marietta's Pflaumer: In diversified sales, basis for optimism.

national roundup

Rounding out the week's domestic news.

Companies

Price Bros. (Quebec), producer of pulp and paper, plans to issue new common stock to acquire the 51% interest in Anglo-Newfoundland Development Ltd. (Grand Falls, Nfld.). The stock is now held by Associated Newspapers (London, U.K.). Price will also offer to acquire Anglo-Newfoundland stock held by Canadians, but will not make the offer to stockholders in the U.S. The proposed acquisition would make Price one of Canada's largest factors in the pulp field.

Fairmount Glass Corp. (Indianapolis, Ind.) has been organized as a new subsidiary of Inland Container Corp. (also of Indianapolis) to acquire the properties and carry on the business of Fairmount Glass Works. This acquisition is expected to add $10 million/year to Inland's sales volume, which last year was $93 million.

Chas. Pfizer & Co. (New York) has established a new division to be known as Labaron Pharmacal, as an operating base for the company's "accelerated interest in the proprietary field." First task for Labaron: introduction and test marketing of Beam, a preparation for irritated eyes.

Expansion

Laminated Glass: A fabricating plant for production of curved laminated auto glass will be the first unit to be erected by Libbey-Owens-Ford Glass Co. (Toledo, O.) on its 874-acre industrial site near Stockton, Calif. Directors last week approved a $10.5-million appropriation and the transfer of some existing equipment for the new plant. The company purchased the site two years ago "as part of a long-range planning program" (*CW, July 4, '59, p. 21*).

Chemical Specialties: In Charlotte, N.C., Interchemical Corp. (New York) is starting construction of a new facility that will include manufacturing, laboratory, office and storage space for three of the company's principal divisions: Finishes, Printing Ink, and Color & Chemicals. The plant—going up on a 15-acre site in Charlotte's Arrowood development—will be completed late this year.

Glass Fibers: Johns-Manville's Fiber Glass Division will install equipment in its plant at Parkersburg, W.Va., to start production of glass-fiber home insulation by July 1. This follows a 38% plant expansion project, started last December, and will make this plant the largest of the division's six manufacturing units.

Natural Gas Liquids: Continental Oil Co. (Houston) will build a $1.75-million plant at Hennessy, Okla., to extract propane, butane and other natural gasoline products from natural gas. The plant will be owned 50% by Conoco, 50% by other companies and individuals.

Potash: Utah Potash Co.—newly organized subsidiary of Texas Gulf Sulphur Co.—has awarded a multimillion-dollar contract to Harrison International for sinking a 2,800-ft. shaft and completion of development work at the company's Cane Creek, Utah, potash project (*CW, April 15, p. 43*).

foreign roundup

Rounding out the week's international news.

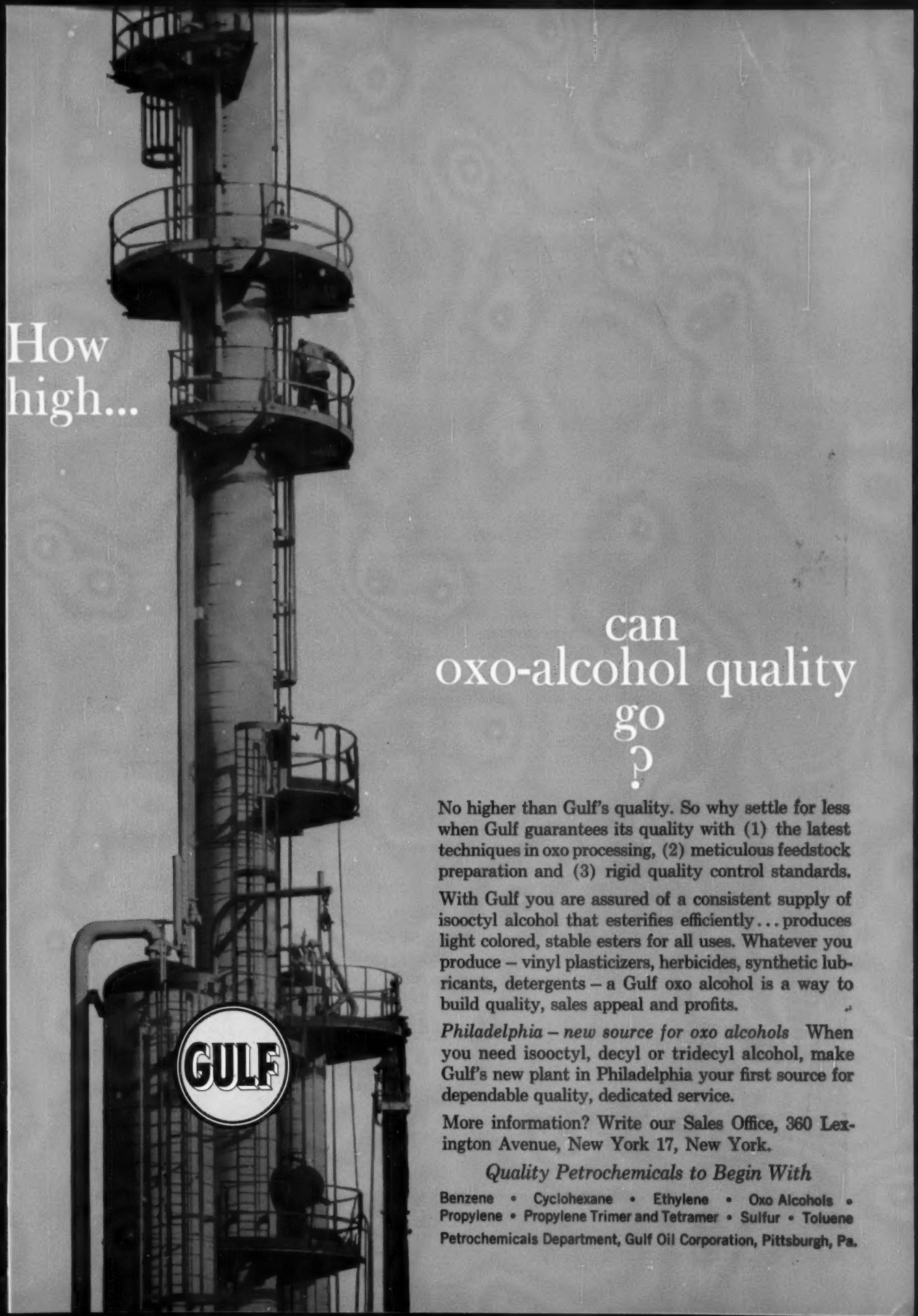
Carbon Black/Mexico, Indonesia: Negromex S.A., recently formed by a group of Mexican businessmen, will build a $4-million, 33-million-lbs./year Phillips-licensed carbon black plant at Salamanca, where Pemex has a refinery. Due onstream: 12-14 months. And Refining Associates (Los Angeles) will build a $4-million carbon black plant at Rantau, Indonesia, for P.T. Permina, a government-owned company. The U.S. company will finance the project in exchange for crude oil at market prices.

Nuclear Fuel/U.K.: Nuclear Developments Ltd., first British company to enter the civil nuclear fuel field, has been formed by Imperial Chemical Industries, Rolls Royce, and Rio Tinto Co. It will make fuel elements.

Polyethylene/Bulgaria: Russia will build at Bugas, Bulgaria, an oil refinery with an ultimate capacity of 2 million metric tons/year and an adjacent 10,000-tons/year polyethylene plant. Other polyethylene plants are going up in Czechoslovakia, East Germany, Poland and Rumania with Western help (*CW Business Newsletter, April 22*).

Salt/Brazil: Floods in Brazil have destroyed 350,000 tons of salt—about half the nation's stock—worth $5 million, turning Brazil from a potential exporter this year into an importer. Annual output (from sea-water evaporation) is 1.3 million tons.

Petroleum/Switzerland: Raffinerie du Rhone S.A. is starting work on Switzerland's first refinery, a 2-million-tons/year unit. Site is in Collombey, on the Rhone.



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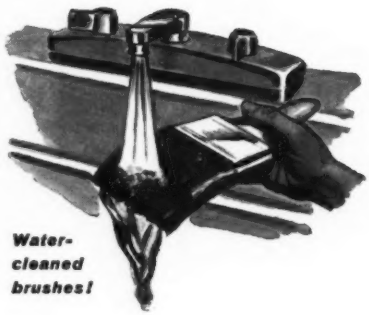

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Washington
Newsletter

CHEMICAL WEEK
April 29, 1961

Expanded federal aid to build sewage disposal plants seems almost certain to be approved by Congress this year. Proponents, with strong Kennedy Administration support, pushed an expansion bill intact through the House Public Works Committee. It would boost to $100 million/year the amount of federal funds available for 10 years to help municipalities build sewage disposal plants. The present annual limit is $50 million.

The measure, sponsored by Rep. John A. Blatnik (D., Minn.), also would broaden federal authority to enforce anti-pollution projects on all navigable streams. Such authority now covers only interstate streams. The federal government still would need permission of state or local authorities to enforce navigable-stream pollution-control measures.

•

A proposal to discourage cities from issuing tax-exempt bonds to lure industries from other areas has been introduced in Congress. Such bonds are designed to help municipalities build such things as sewage disposal plants. But Rep. Robert P. Griffin (R., Mich.) says cities in some 15 states, mostly in the South, are abusing the tax exemption by using bond money to finance plants for migrating industries.

Griffin's bill would make these deals less attractive to industry by no longer permitting rent paid on such plants to be a business expense deduction in figuring federal corporation taxes. Chances of approval by Congress this year are considered fairly good.

•

Nonprofit research groups will get a close check soon from the House Science and Astronautics Committee, headed by Rep. Overton Brooks (D., La.). He wants to determine whether "abuses, waste and restrictive practices" exist in the operations of private, nonprofit organizations that handle research and development for federal agencies.

The tax-exempt status of nonprofit organizations long has been a subject of controversy in the scientific community. Some 15 of these groups will be studied by the Brooks committee to determine such things as (1) extent of the impact of their higher salaries on university faculties and (2) any possible conflict of interest involved when staff members of a nonprofit organization also are officers of private companies that receive subcontracts from the nonprofit unit.

•

Commercial rights to inventions developed with federal funds should be retained by the inventor, says Union Carbide's vice-president of research, Augustus B. Kinzel. Speaking in his capacity as a member of the Manufacturing Chemists' Assn.'s Research Advisory Committee, Kinzel made his plea before the Senate Patents Subcommittee.

In the "vast majority" of cases, Kinzel testified, "both the public interest and the equities are best served when the government obtains a royalty-free, nonexclusive license to use the inventions for government

Washington Newsletter

(Continued)

purposes, and the inventor or contractor retains the commercial rights and title." This is the system generally followed by the Defense Dept. The subcommittee is considering bills that would force the Atomic Energy Commission to conform. The legislation is given little chance of approval this year.

•

Expense account tax "abuses" would be halted abruptly under Kennedy's new tax proposals (*see p. 24*). His recommendations are aimed at eliminating deductions for such things as yachts, hunting lodges, country club dues and pleasure trips disguised as a business expense.

Kennedy is not specific. But his tax advisors have something like this in mind: A $25/day limit for room and meals while traveling (about double the government allowance), a $10 limit on gifts, and perhaps a limit on expenses for luncheons and cocktail parties. Its chances of Congressional approval are considered slim.

•

Solid fuels for space rocket propulsion are attracting interest where it can do the most good: with Congress, the military and National Aeronautics & Space Administration. The immediate result is likely to produce more money for research in this area in the coming year. Best estimates are that Congress may add about $30 million to the $1.2-billion space budget for solid-fuel spending.

Latest entry in the solid-fuel field for building big rockets in the multimillion-pounds-thrust class comes from Atlantic Research Corp. Last week it unveiled a plan for a "gel-solid" booster. Kept in a thick slurry condition, the "gel-solid" would be shipped to the launching site and pumped into internal trays in the rocket casing, eliminating the curing and bonding problems of conventional solid fuels. The added weight of the trays would be offset by the simplicity of the method, Atlantic predicts. The Air Force has shown strong interest in the concept.

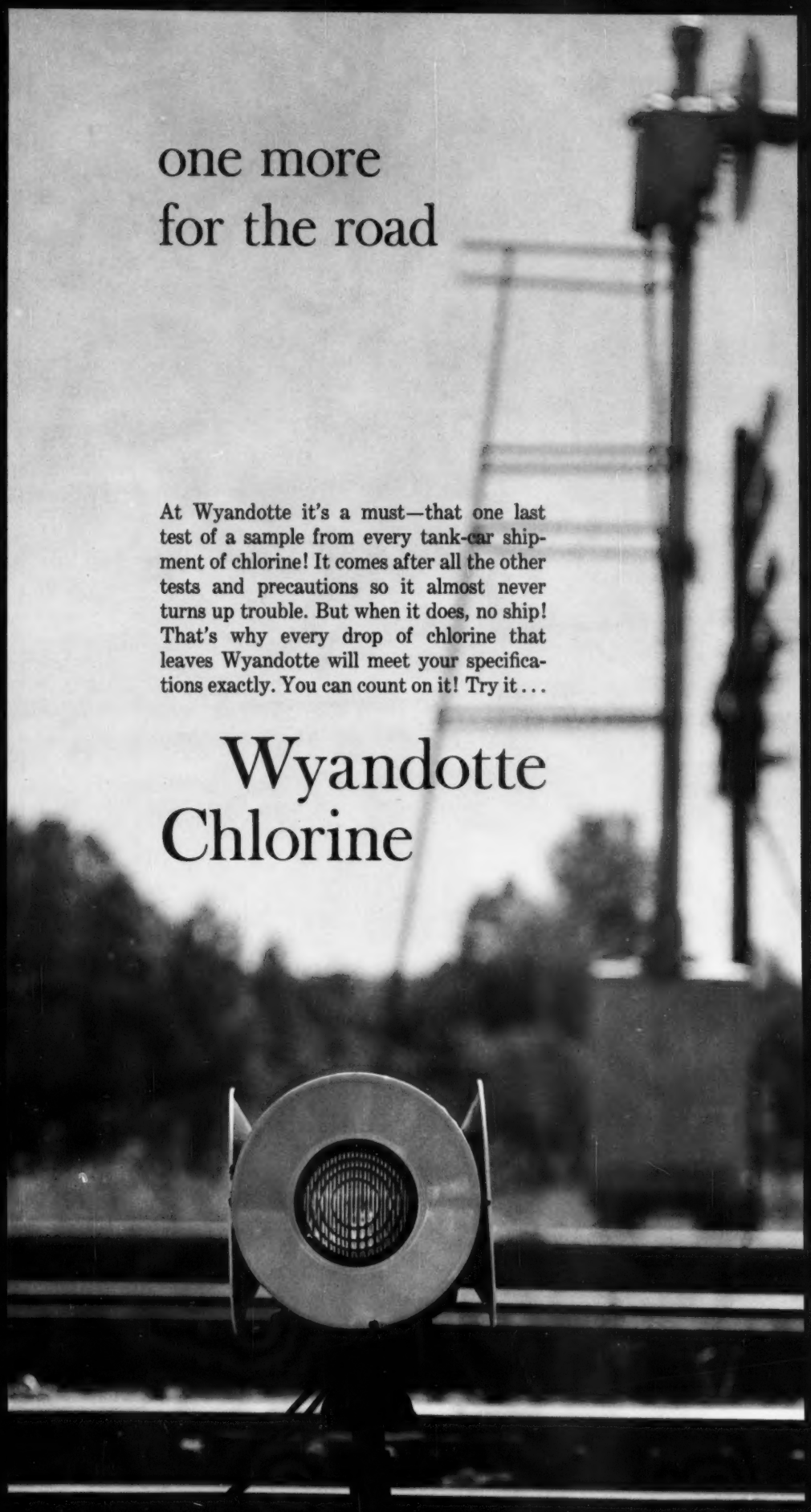
•

A plan to scuttle the Polaris A-2 project is being considered by the Pentagon. This is the 1,500-mile version of the Navy's solid-fueled fleet ballistic missile. Aerojet-General is contractor for the first-stage engine; Hercules builds the second stage. The A-1, 1,200-mile model of Polaris, powered by two Aerojet engines, already is operational.

Some defense experts are arguing that the extra money needed to develop and build the A-2 no longer is justified since the new Pentagon budget calls for accelerated development of the A-3, 2,500-mile Polaris model. Aerojet will build the first-stage engine. No production source has as yet been selected for the second stage.

•

A new booster for the Dyna-Soar manned space flight vehicle is in the offing. The Air Force originally planned to use a modified Titan II booster. But NASA (cosponsor of the project) now wants to use the 1.5-million-lbs. thrust S-1 engine cluster that powers the first stage of the big Saturn vehicle.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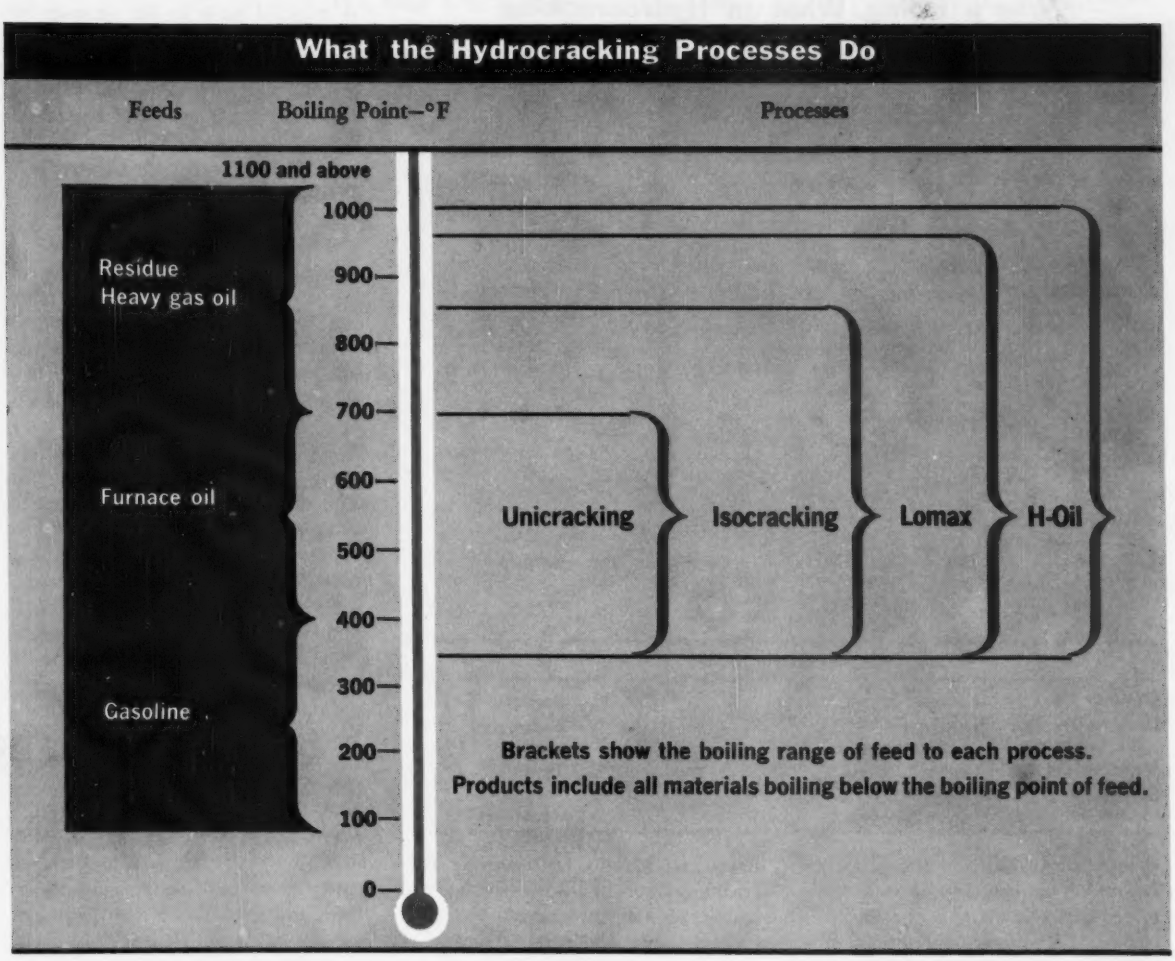

Finding New Dollars in Distillates

Construction of a new, $5-million Isocracking unit is under way at Standard Oil of Ohio's Toledo, O., refinery. It's just one of a rash of hydrocracking units that will soon be appearing on the refinery scene (see table, p. 34). Outlook: hydrocracking will be part of all new refineries and many existing ones.

This is an optimistic forecast. But the economic incentive is strong. Hydrocracking can break high-boiling petroleum fractions down to low-boiling, higher-priced cuts such as gasoline. "Hydrocracking allows you to take the slop and make high-test gasoline," is the way one refiner puts it.

Hydrocracking's fortunes are tied to three big oil market trends:

(1) Octane ratings of premium gasoline will increase.

(2) Conversion of the olefinic constituents of refinery gases into highest-quality gasoline will be much more common than it is now.

(3) The demand for jet fuel will continue its climb—accompanied by increasingly stringent quality specifications.

Hydrocracking is just one step beyond ordinary catalytic cracking. But it's a big step. The hydrogen enhances the catalytic action, helps rip apart carbon atoms. Thus, hydrocracking is more efficient than catalytic cracking in breaking high-molecular-weight hydrocarbons down to lighter molecules. Hydrocracking does this at lower temperatures.

It means that a refiner can take furnace oils worth 10-15¢/gal. and make gasoline worth 23-30¢/gal.

Choice: Right now there are four major hydrocracking processes available for licensing from four firms: (1) Isocracking, from California Research Corp. (San Francisco); (2) Unicracking, from Union Oil Co. of California (Los Angeles); (3) Lomax from Universal Oil Products (Chicago); (3) H-Oil from Hydrocarbon Research (New York).

Isocracking (*CW, Oct. 24, '59, p. 39*) has had the benefit of almost two years of commercial operation. Running at the parent company of Cal Research, Standard Oil (California) (Richmond, Calif.), the process has just been through a new evaluation. Ran-

Who's Doing What in Hydrocracking

Company	*Process*	*Plant Data*	*Status*	*Location*
Golden Eagle Refining Co.	Lomax	20,000 bbls./-day capacity producing gasoline and by-product coke	Starting to build	**Torrance, Calif.**
Powerene Oil Co.	Lomax	2,200-b/d. capacity to convert diesel oil and cracked naphtha into gasoline	Due onstream this June	**Santa Fe Springs, Calif.**
Standard Oil (California)	Isocracking	1,000-b/d. capacity; feeds (up to 800-900 F boiling point) are cracked to gasoline	Operating almost two years	**Richmond, Calif.**
Standard Oil (Ohio)	Isocracking	7,500-b/d. capacity to convert straight-run and cracked gas into gasoline; investment: about $5 million	Due to be onstream end of '61	**Toledo, O.**
Tidewater Oil Co.	Isocracking	20,000-b/d. capacity; estimated investment: $20 million	Estimated completion late '62	**Avon, Calif.**

Unconfirmed

Caminol Co.	Lomax	**Hanford, Calif.**
Douglas Oil Co. of California	Lomax or Isocracking	**Paramount, Calif.**
Maruzen Oil Co.	Isocracking	**Japan**
Signal Oil & Gas Co.	Lomax	**Houston, Tex.**

dom check of the data shows operating and investment figures up to 25% more attractive than previously.

Basically, Isocracking consists of a unit to remove sulfur and nitrogen compounds from the feed—Cal Research's HDN process—plus catalytic reforming. (In some cases sulfur and nitrogen removal may not be needed.) Feed is combined with hydrocarbon recycle and makeup hydrogen streams, then heated to reactor inlet temperature. The mixture passes down through a fixed-bed catalytic reactor. Of the reaction products, a hydrogen-rich stream is recycled and the liquid phase is fed to a distillation train, where the desired products are recovered.

Typical feeds are cracked naphthas, cycle oils and other distillate stocks, which are in perennial oversupply in California. Consequently, Isocracking, like the other hydrocracking processes, has had most acceptance in the West.

Isocracking, however, found its first licensee in '59 in the midcontinent region. Standard Oil (Ohio) bought the process for its Toledo refinery. Its reasons for choosing Isocracking: California Research had full-scale operating experience with the process; and a reasonable payout—then about three years—seemed assured. Typical evaluations now show a 2.6-year payout (after taxes at an East Coast refinery or West Coast coking refinery) for middle distillate conversion. Tidewater was the second Isocracking licensee (*CW, Nov. 12, '60, p. 82*).

Unicracking (*CW, Nov. 21, '59, p. 172*) hasn't landed a customer yet, but several firms are reported to be interested. The big hurdle is lack of commercial data. Unicracking has been through pilot-plant evaluation, is at a disadvantage with respect to Isocracking, which has had two years' commercial operation.

Unicracking and Isocracking are very similar. Union says that its process can handle high-sulfur and nitrogen-content feeds, yield products of low sulfur and nitrogen content. Isocracking cleans similar feeds in its first step.

Unicracking uses two stages of fixed-bed catalytic reactors. Hydrogen is recycled back to the makeup hydrogen. And the reactor effluent is fractioned to separate butanes, fuel gas, diesel blend stock and gasoline.

Lomax is getting several new takers. Several independent refiners, whose operations rely heavily on Universal Oil Products' processes, are about to add UOP's Lomax.

The process itself (*CW, April 2, '60, p. 62*) has a number of appealing features. It's flexible. Feed material can include kerosines, diesel fuels, catalytic cycle oils, vacuum gas oils, coker distillates and other distillates from catalytic or thermal operations.

So Lomax can fit in behind the catalytic cracker or replace it altogether, although other hydrocrackers can also do this. And Lomax can convert higher-boiling fractions into middle distillates—to meet winter season needs and the needs of mid-U.S. and Eastern markets—or into gasoline, which is in greatest demand in the summer.

Lomax unit operating costs for processing 9,800 bbls./day of 400-650 F virgin distillate would be as follows. Operating costs in cents/barrel are: labor, supervision, and administrative overhead, 1.65¢; utilities, 19¢; laboratory, 0.25¢; catalyst and chemicals, 3.50¢; and maintenance, local taxes and insurance, 6.55¢. This adds up to 30.95¢.

An illustration of payout on investment (before income tax) including Lomax, a Platformer, fluid catalyst cracking, gas conversion, alkylation and polymerization—all the integrated refinery units—comes to the following: 2.5 years for an excess-fluid catalytic cracker feed; 1.5 years for a 400-650 F virgin distillate feed.

H-Oil is claimed to handle feeds with the widest range of boiling points. This Hydrocarbon Research process is finding its greatest acceptance in Europe, where it will be used to convert very heavy gas oils into furnace oil. European markets are hungry for furnace oil, not gasoline —the reverse of the case in the U.S.

This process, unlike the others, uses an ebullating bed of catalyst. Hydrocarbon Research feels that this provides intimate contact between oil, hydrogen and catalyst, thereby increasing catalyst utilization. Also, catalyst can be added and removed

WHAT'S NEWS IN ENJAY TECHNICAL SERVICE

Enjay helps reduce cost of 90°C vinyl wire insulation...

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An H-Oil plant of 20,000-bbls./day capacity would require about 20 million std.cu.ft./day of hydrogen. Tidewater Oil Co., which is getting a 20,000-bbls./day Isocracker, is said to be shopping for a very big—50-million-std.cu.ft./day — hydrogen plant. But Tidewater's Avon, Calif., plant is a large complex with other possible hydrogen applications. And H-Oil's requirements may not be lower than Isocracking's because the feed to the two hydrocrackers may differ widely. Also the H-Oil 20-million-std.cu.ft./day figure assumes a proportionate scaleup from pilot-plant data.

If Tidewater gets a 50-million-std. cu.ft./day hydrogen plant to accompany its Avon Isocracker, it will be one of the largest hydrogen plants ever built. Right now, Tidewater is getting a 30-million-std.cu.ft./day hydrogen plant from Selas Corp. (Philadelphia) for its Delaware City, Del., refinery. But there's no telling whether Tidewater is thinking about another hydrocracking unit at this Eastern location. (These large hydrogen plants compare to hydrogen capacities ranging up to about 35,000 std.cu.ft./day at ammonia plants, traditionally among the biggest hydrogen consumers.)

Other Processes: Besides the four hydrocracking processes available for licensing, several large oil firms are developing their own. Gulf is reported to have its own process at Harmonville, Pa. Socony Mobil has developed its own catalyst—platinum on a solid base of silica and high-acidity alumina—but does not talk of a process. Esso has reportedly been seeking a very large source of hydrogen, which could be for a proprietary hydrocracking process.

Hydrogen Perk-Up: Contractors that build hydrogen plants are perking up to the needs of hydrocracking units. Although some refiners have enough hydrogen on hand from reforming operations, others will need more hydrogen capacity.

Hydrogen needs are crucial in evaluation of the economics of hydrocracking. A small oil refiner will have trouble raising the capital for a hydrocracking unit alone. If he must tack on hydrogen investment—even though the cost of hydrogen plants is going down—the burden becomes heavy indeed.

On the other hand, refiners may have hydrogen off-gas from reformers that could be put to good use in a hydrocracker. And since the market is swinging toward higher aromatic-containing motor fuels, a surge in reforming capacity is likely in the next few years.

The Market: The reason why West Coast refiners are more interested in hydrocracking than the Texas firms stems from the varying market picture. Product prices and demand differ greatly according to location.

On the West Coast, demand for furnace oil and other high-boiling fractions is typically low, while the call for gasoline is strong. In Europe, where refineries usually lack catalytic cracking units, hydrocracking is in strong demand for different reasons. There, very high-boiling stock is the feed; it's cracked into furnace oil, not all the way to gasoline, as is done on the U.S. West Coast.

Capital Needed: The major stumbling block to new hydrocracking units is lack of capital. Independent oil refiners look uneasily at an investment of several million dollars. "To us, it's the equivalent of a $200-million investment by the big boys," says one independent oil man.

But for the long-term, hydrocracking is on sound ground. Jet fuel and high-octane automobile gasoline are products with rising sales curves.

New refineries in Europe and Japan —even established ones like Maruzen Oil Co.—will, almost without doubt, get hydrocrackers.

Just which process will win out is hard to say at this point. Lomax and Isocracking are vying for leadership today. But Lomax is about to move into the No. 1 spot on the strength of increasing domestic orders and European attention. And H-Oil developers say that they too have a few European jobs on hand. One thing is clear: hydrocracking is here to stay.

Also plainly evident is the advent of a new market for hydrogen. Hydrogen plants ultimately may become a refinery necessity, be regarded as a utility.

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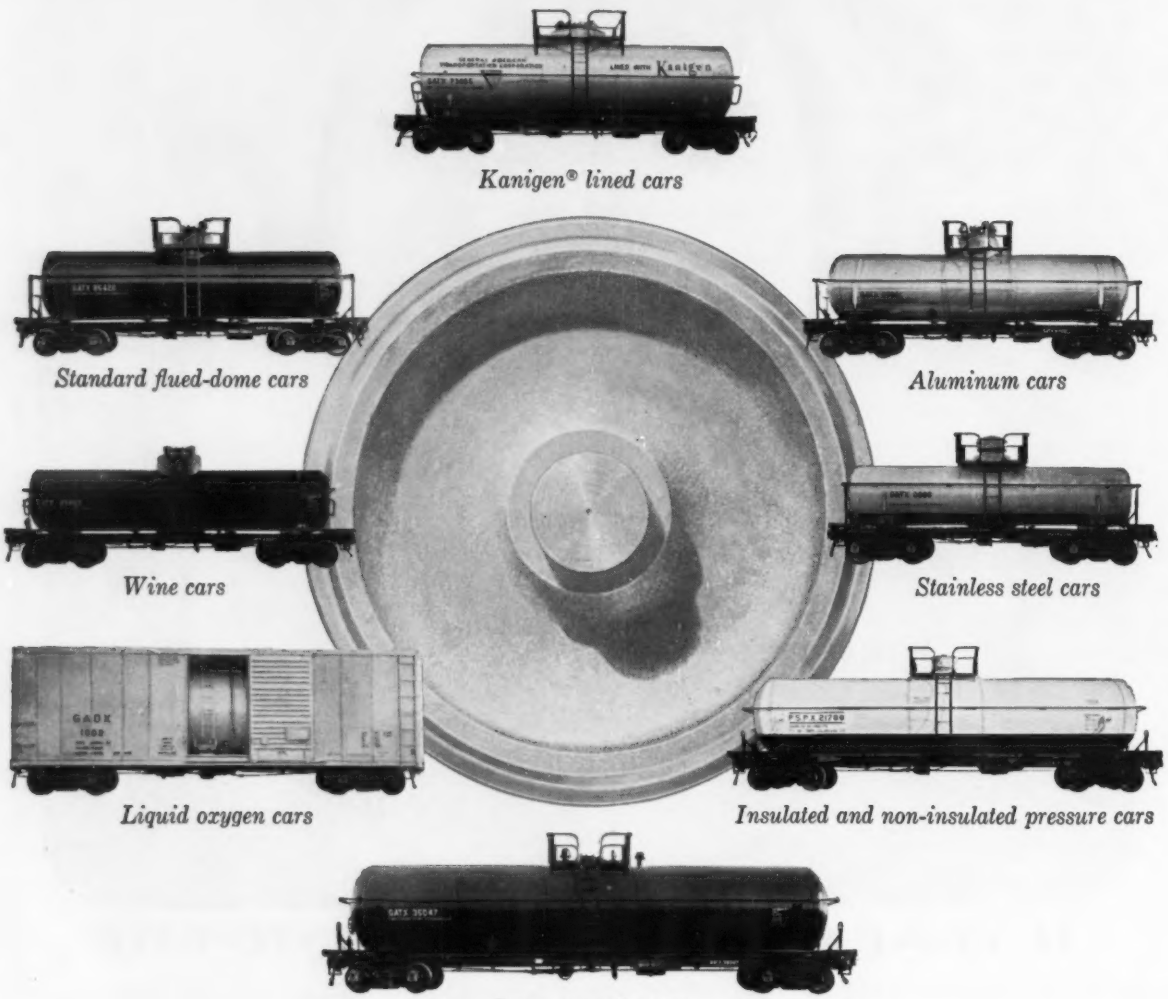

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GAF's Dinkins (left) and Shelton pinpoint new objectives in growth, products, markets.

A Regrouped GAF Grooms for Growth

Despite its well-known ownership problems, General Aniline & Film Corp. (New York) is anything but glum about its future. It is ready for more expansion, has plans for profitable new products and is already reaping gains from its recent reorganization.

Brightly coloring the picture are GAF's steadily rising profits. Last year's net earnings after taxes were $7.2 million on sales of $160 million. And '61's figures should be still higher, Philip M. Dinkins, GAF president and chief executive officer, told CHEMICAL WEEK last week (in '54 earnings were $2,519,000 on $104,964,000 sales.)

New Command Chain: Also largely contributing to the optimism is the smooth operation of the new organization. Aim of the new plan—two group vice-presidents and a general manager (International Group) report directly to Dinkins (*chart, p. 40*), along with an executive vice-president and a vice-president each for sales and development—was to clarify responsibility. And, says Dinkins, this has indeed been the case. (Dinkins, in turn, reports to the board of directors—appointed by the U.S. Attorney General—which is now headed by Thomas A. Morgan, former president and chairman of Sperry Corp. and a GAF director since '51.)

The setup of the new Chemical Group (an internal title) exemplifies the streamlining under the new organization plan. The Chemical Group is headed by a vice-president, who reports directly to the president. Reporting to this vice-president are general managers for each of three divisions: Antara Chemicals, Collway Pigments and General Dyestuff Co. Each division has its own manufacturing, sales and research, which are coordinated at the group level.

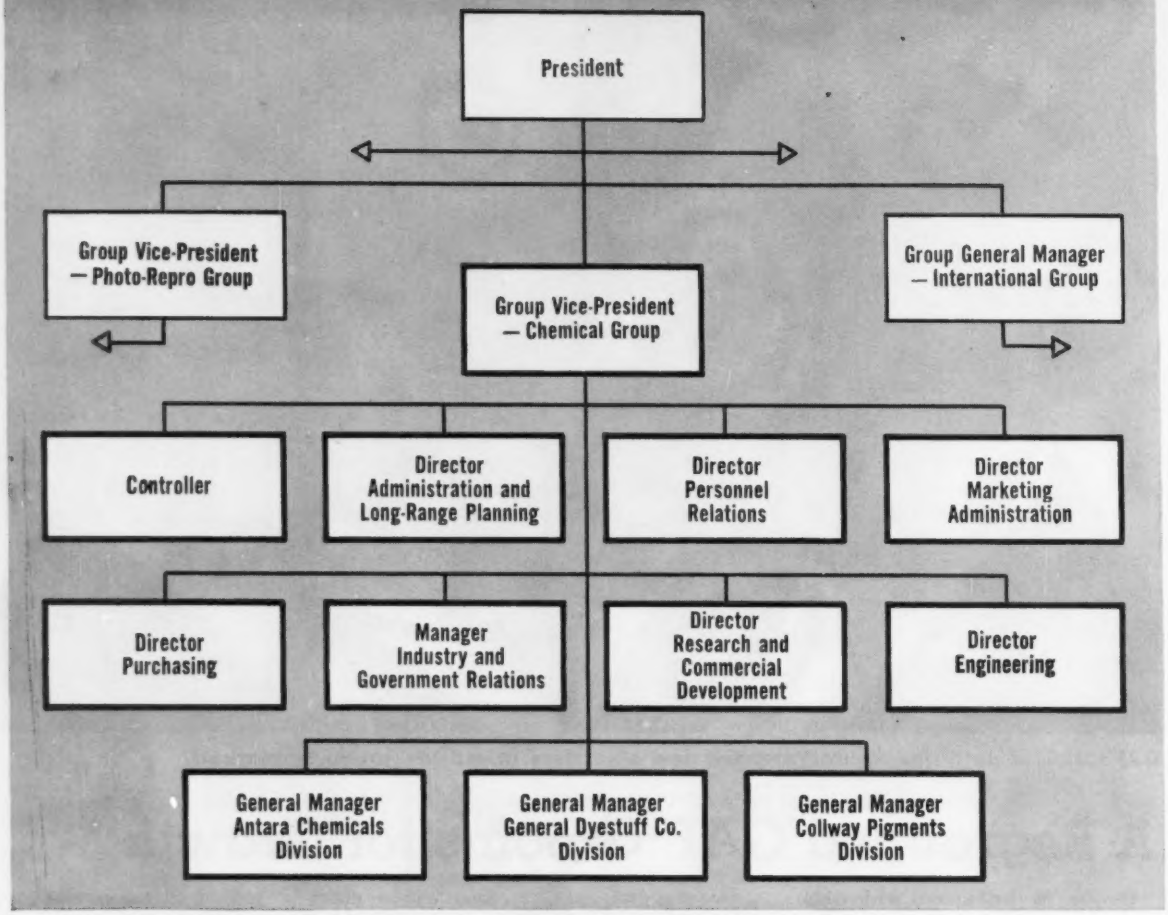
Under the old system, dyestuffs and chemicals were handled by one division (Dyestuff & Chemical Division) under a general manager who reported to a management committee, of which the president and corporate vice-presidents were members.

Collway was a separate organization with its own president, who also reported to the management committee. The effect of the change has been to clearly separate the handling of dyes, chemicals and pigments, set up responsibilities that don't overlap and continue to economize on such services as purchasing and personnel.

Begun last September and completed this month, the reorganization has another aim besides bringing greater efficiency and profitability to GAF's operation. That, according to Dinkins, is to "set the stage for further expansion."

Expansion Inhibitor: Because the U. S. government holds 98% of GAF stock, GAF must make acquisitions for cash rather than through the often more expedient device of exchange of shares. Ownership of the stock,

Chemical group head reports to president in new GAF organization



which was seized as alien property during World War II, is currently in litigation. Interhandel, a Swiss holding company, claims that 94.8% of the stock should be returned to it. Two percent of GAF stock is uncontested, owned by approximately 1,300 minority stockholders, and is traded over-the-counter. (Although the stock has not paid dividends, future payments are considered likely.)

While Attorney General Robert F. Kennedy has said he would like to "get rid of" GAF, he hasn't specified how the Justice Dept. would do this. The suit by Interhandel is perhaps a year away from being tried and Andrew F. Oehmann, executive assistant to the Attorney General, is pessimistic about the outlook for an out-of-court settlement. He says that the burden of proof of ownership is on Interhandel but that the latter has not yet offered to negotiate.

However, Dinkins tells CHEMICAL WEEK that GAF has accomplished acquisitions despite its handicap (e.g., in late '60, the company purchased the principal assets of Grant Photo Products, Inc., to strengthen Ansco Division's position in making industrial photographic papers). And GAF is looking ahead to other acquisitions.

Product Plans: Laced throughout GAF's new organization is the emphasis on marketing know-how, a symptom of tougher selling conditions generally being experienced in the CPI.

Harold G. Shelton, vice-president of the Chemical Group, is market-oriented, having joined GAF in '45 as sales manager of Antara Chemicals, moving up to director of marketing of GAF's Dyestuff and Chemical Division ('57), general manager ('58) and vice-president and group executive of the Chemical Group ('60).

One Shelton chore will be to lop off nonprofitable items from his group's broad list of products—now including 1,066 dyes, 314 pigments, 656 chemicals. But he is also bent on pushing research dollars into areas where they may return the most on the investment. GAF spends about $7 million annually on all its research operations.

Each of the Chemical Group's three divisions has its own research facilities and can draw on the group's central research in Easton, Pa. The Photo & Repro Group, under Leopold Eckler, consists of the Ansco and Ozalid Divisions, each of which has its own research labs as well.

Reactive dyes for synthetic fibers (acrylics and polyesters) are a top research project at General Dyestuff (*CW, March 25, p. 53*). So are chlorine-stable textile and detergent bright-

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eners capable of carving a $5-million niche in the $17-million brightener market.

Antara Chemicals is working on a complicated product line that includes surface-active agents (emphasis on nonionics), heavy chemicals, carbonyl iron and other metal-organics, chemical intermediates (principally dye and pigment-formers), acetylene chemicals, and ultraviolet absorbers (insufficient solubility in polyolefins is the big problem).

Among the acetylene chemicals in which GAF has a heavy stake, are polyvinylpyrrolidone (PVP, which is made at Calvert City, Ky.), and a new insoluble version of PVP—that's being touted as an absorber of tannins in brewing, as a possible cigarette filter and for removing noxious chemicals such as phenol from waste water at refineries. Butenediol is also thought to be headed for big markets. For protecting polyethylene from sunlight Antara has a new benzophenone derivative that, it says, "looks good."

Collway Pigments Division is looking for new, lightfast, bleed-resistant, colorful entries into the $55-million organic pigments market. One new product: phthalocyanine green, which is yellower than others, permits this durable pigment to be used in a wide variety of color blends that feature heat stability. Constantly mounting plastics-molding temperatures are behind the drive for heat-stable pigments.

Long-term GAF research objectives include agricultural chemicals (e.g., nematocides), where it has "some interesting leads"; pharmaceuticals ("we're working with some leading drug companies"); and the vinyl ether family of acetylene derivatives. On the horizon: a new polyamide derived from acetylene.

Export Growth: GAF has had startling success in the export field, now maintains sales outlets in 73 foreign countries among them: Liechtenstein, Tahiti, Surinam, Israel. Export sales reached a new peak last year (GAF won't give details), and are expected to keep rising. International operations are headed by William Hansot. That's the plan for the rest of GAF, for that matter, a target its management thinks is within striking—if not necessarily easy—reach; in any case, the company is set up now to handle any new business that it wins.

KEY CHANGES

J. Earl Burrell to vice-president of operations for the chemical division, Pittsburgh Plate Glass Co. (Pittsburgh, Pa.).

Thomas F. O'Neil to chairman of the board, General Tire & Rubber Co. (Akron, O.).

Irving Roberts to vice-president, Reynolds Metals Co. (Richmond, Va.).

Zenas Crocker to executive vice-president, Nixon-Baldwin Chemicals Inc. (Nixon, N. J.).

Ted W. Swift to vice-president; **Joseph G. Hartsig** to assistant vice-president, Arizona Fertilizer and Chemical Co. (Phoenix).

Glenn P. Roddey to president; **John C. McGregor** and **James McFarland** to the board of directors, Rozilda Laboratories, Inc. (Long Island City, N. Y.), manufacturer of surface-active agents and organic chemicals.

James M. Ewell to the board of directors, Procter & Gamble (Cincinnati).

Donald A. Detmer to controller; **Frank C. Horton** to general plant manager; **William J. McGhee** to manager of research and engineering, Standard Ultramarine & Color Co. (Huntington, West Va.).

Lewis W. MacNaughton to chairman of the board of directors, Transnuclear Corp. (Westwood, N. J.), subsidiary of Isotopes, Inc.

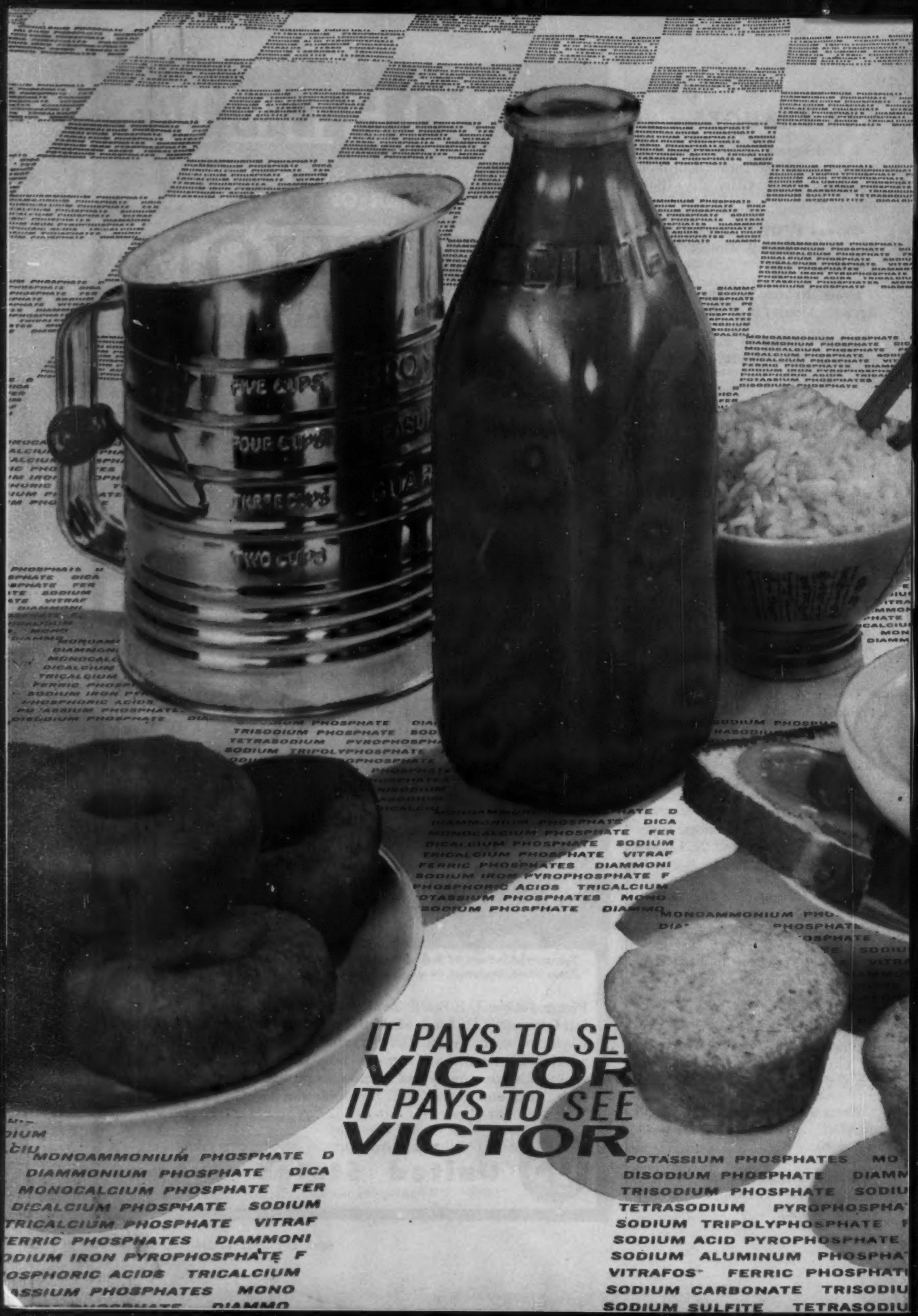
Amory Houghton to chairman of the executive committee, Corning Glass Works (Corning, N.Y.).

Marshall M. Manns to manager of Agricultural Chemical Sales, Great Lakes Chemical Corp. (Los Angeles).

Thomas B. Richey, Jr., to vice-president and member of the board of directors, Malmstrom Chemical Corp. (Newark, N. J.).

Grant A. Brown to the board of directors, Amoco Chemicals Corp. (Chicago).

Donald A. Bender to the board of directors, The Carwin Co. (North Haven, Conn.).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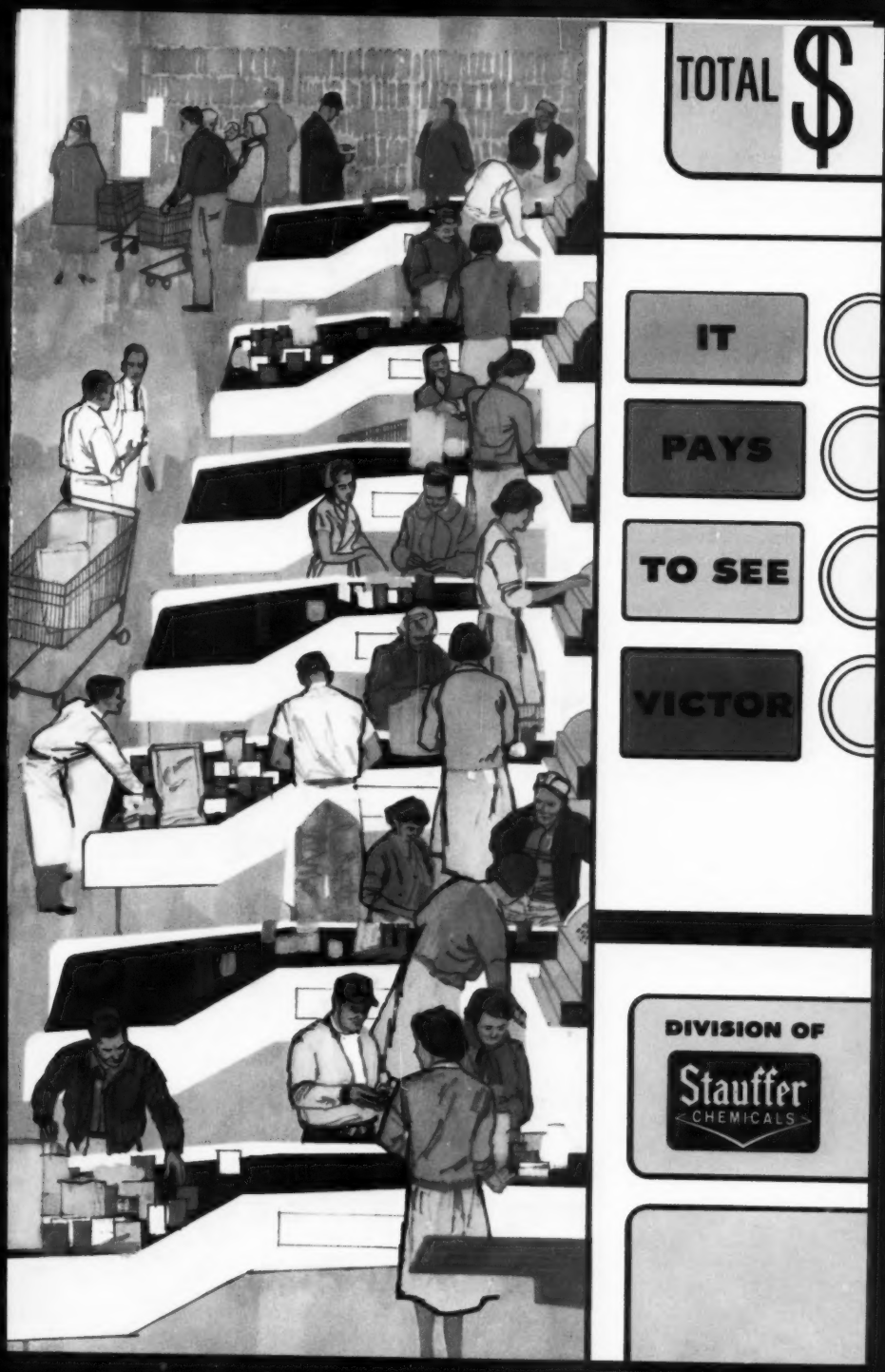
SODIUM SULFITE TETRASODIU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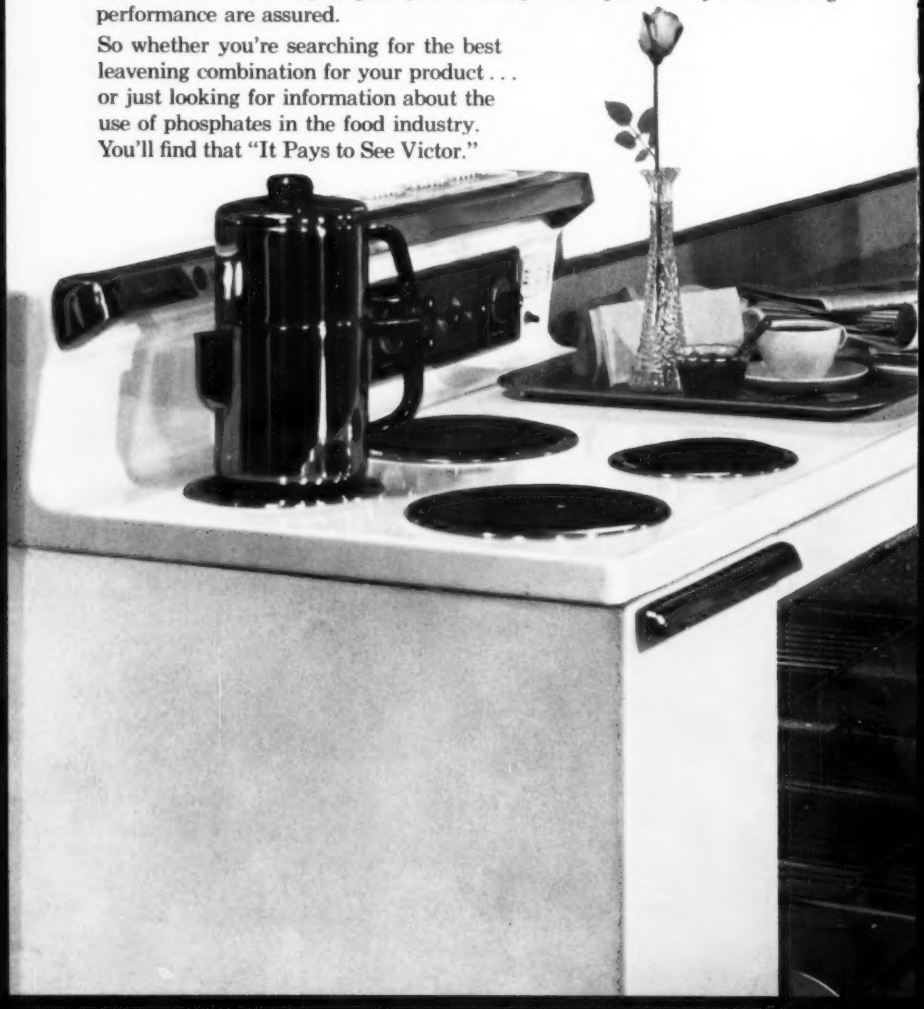

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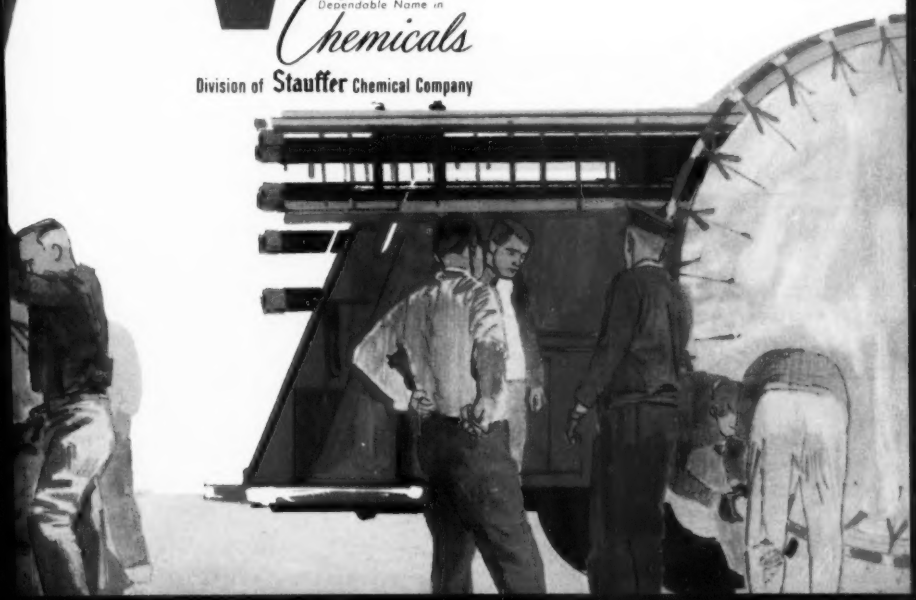

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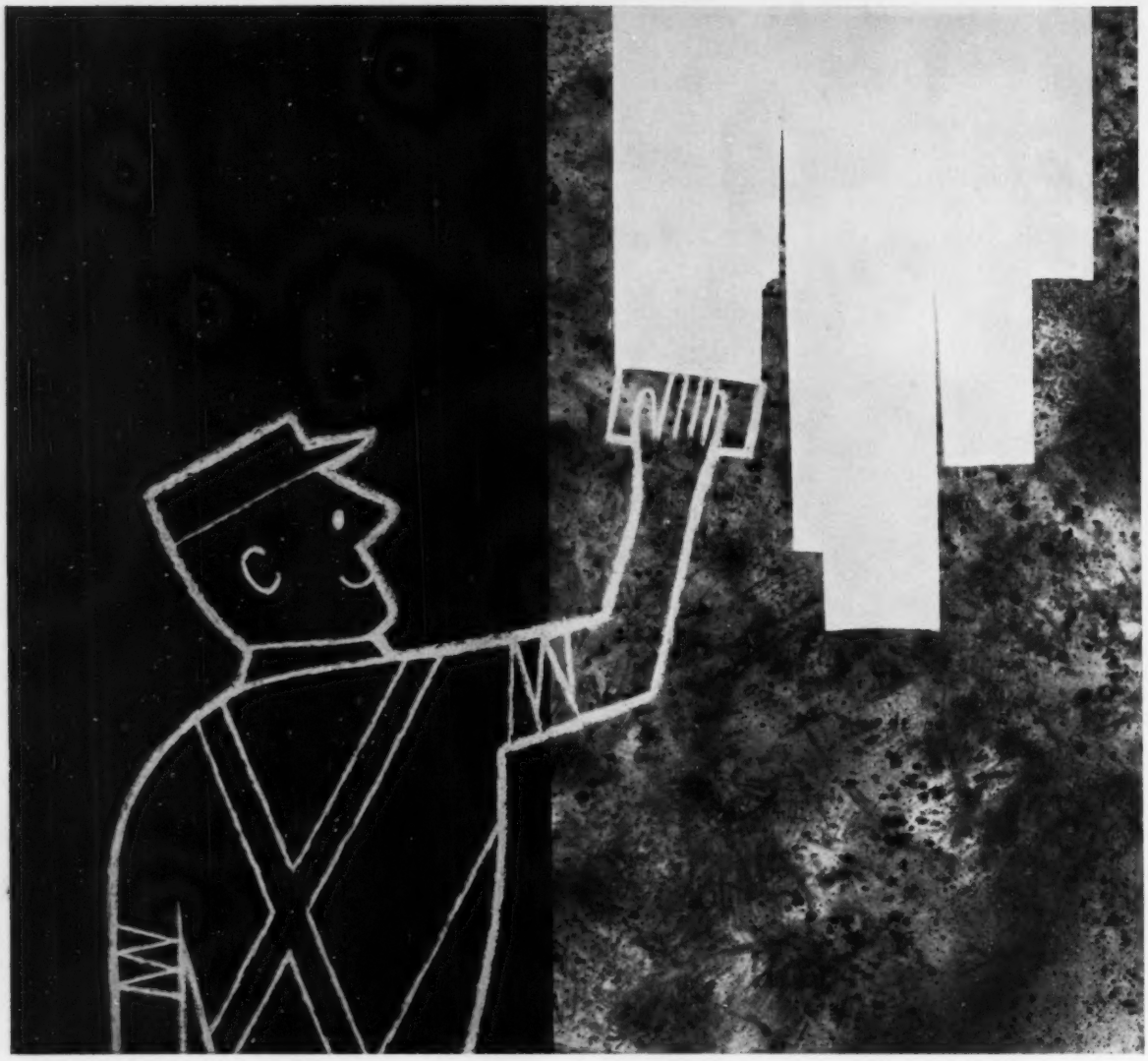

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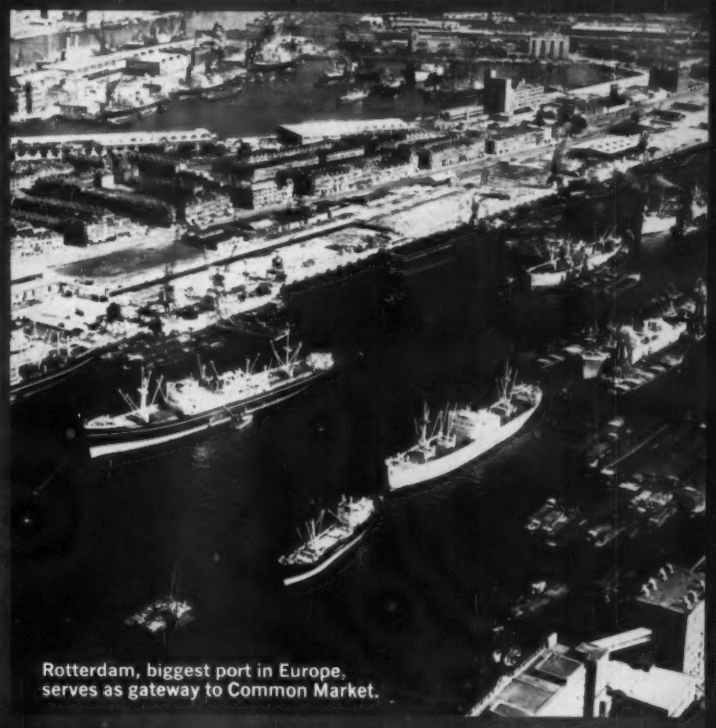
Heavy Role of Exports in Dutch Chemical Sales

(million dollars)	1957 Sales	1957 Exports	1959 Sales	1959 Exports
Nitrogen, phosphate fertilizers	105	57.0%	118	51.7%
Rayon and synthetic fibers	66	66.7%	79	70.9%
Plastics	60	51.7%	76	57.9%
Pharmaceuticals	56	57.1%	74	51.4%
Paints, printing inks	59	18.6%	68	22.1%
Soaps, detergents, cleaning agents	39	12.8%	58	10.3%
Dextrin, adhesives, textile auxiliaries	21	66.7%	24	70.8%
Pigments, dyestuffs, enamel frits	21	66.7%	22	68.2%
Essential oils and essences (synthetic)	18	77.8%	18	77.8%
Flavors, perfumes	18	77.8%	18	77.8%
Cosmetics, polishes, lubricants	16	37.5%	18	38.9%
Gases, carbides	12	16.7%	12	16.7%
Light chemicals	104	58.7%	113	70.8%
Heavy chemicals	66	39.4%	95	47.4%
Totals	644	49.7%	776	51.0%



Rotterdam, biggest port in Europe, serves as gateway to Common Market.

Holland: Hub for U.S. Investors

Internationally minded U.S. chemical companies are placing new plants throughout the length and breadth of Europe. But of all the countries they are favoring, in or out of the Common Market, tiny Holland is drawing the highest concentration of new plants.

After World War II and up to the beginning of this year, 39 non-Dutch chemical companies had launched subsidiaries in the Netherlands and 33 had set up joint ventures or otherwise participated with Dutch groups. All but a handful of the outside investors are U.S. firms.

Right now a batch of new U.S. ventures are under construction or are freshly onstream in Holland.

Allied has chosen the Netherlands to launch its first European operation. Earlier this year it bought half interest in Chemische Industries Synres, a resin producer, and plans to build a phthalic anhydride plant at Synres' Hoek site.

Dow's subsidiary, Nederlandsche Dow, which has operated a terminal and warehouse facility at Rotterdam for several years, will this spring put onstream a $2-million styrene-butadiene latex plant. Nearby, Dow and the Dutch giant Staatsmijnen (State Mines) are building a $10.6-million phenol plant.

Du Pont has moved into Holland with two major plants—an Orlon plant, due onstream this year, and a Delrin acetal resin plant, which it hopes to complete in '62. They are on adjacent sites at Dordrecht, near Rotterdam.

Cyprus Mines Corp. (Los Angeles) has formed—with Albatros Superfosfaatfabrieken (part of the Royal Dutch Salt Group)—a subsidiary, Albatros Sulphuric Acid and Chemical Works, which is building a sulfuric acid plant and (with another Dutch company, The Billiton Co.) a titanium pigment plant, which will use technology from The Glidden Co. (Cleveland, O.).

Hercules Powder Co.'s Dutch subsidiary—operating as the company's sales and service center for continental Europe and the Near and Middle East since '25—is building its first plant, a 30-million-lbs./year rosin derivatives unit. It's due onstream in the second quarter of this year.

Goodrich Chemical's joint subsidiary with AKU, Ciago, is winding up a major expansion of its synthetic rubber plant. Heyden Newport, which acquired its Dutch subsidiary, Transicol, last year, is building a synthetic rubber catalyst plant. Archer-Daniels-Midland's affiliate, Scado, will soon have onstream a new phthalic anhydride plant, paid for in part with ADM's ploughed-back profits. Pennsalt's subsidiary, Vondelingenplaat, is building a new organic sulfur compound plant. And Polyvinyl Chemicals is negotiating to build a polymers

plant this year through a majority-owned subsidiary.

And a few weeks ago Esso unveiled its plans for one of the biggest and most important foreign investments so far in the Netherlands. It will build a $17-million aromatics plant alongside the 5-million-tons/year refinery it put onstream last year at Rotterdam. The new plant's capacity: 220,000 metric tons/year of benzene, toluene, xylene and xylene-related products. Engineering studies are under way, and the new project—biggest plant of its kind in Europe—is due onstream in mid-'63.

More than U.S.: So far, foreign investment in Holland's chemical industry since World War II has been almost exclusively from the U.S. Italy's Montecatini is one exception. Last year it built a nitrogen fertilizer plant in southern Holland through its 65%-owned subsidiary, Nederlandaise de l'Azote. And it formed Rotterdamse Polyolefinen Maatschappij with Shell (Shell owns 60% interest) to build a polypropylene plant alongside Shell's Pernis refinery. France's St. Gobain owns a phosphate fertilizer plant at Sas van Ghent, also in the Southern region, and Belgium's Solvay owns a salt electrolysis plant near Roermond.

Britain's Imperial Chemical Industries will probably launch the largest foreign chemical venture in Holland. ICI has leased a 300-acre site near the refineries on Rotterdam's New Waterway and plans to build a complex to produce petrochemicals, "including plastics and related products," probably paints, dyestuffs, general and heavy organic chemicals. This would make it one of the most highly integrated and largest complexes in Holland.

Drawing Cards: This all represents a great deal of investment in such a small country. The reasons are many. As a member of the European Common Market, of course, Holland gives access to a much broader market than it alone represents. And through the already full-fledged Benelux union —with Belgium and Luxembourg— investors in Holland have free access to a market of 20 million people.

Moreover, Dutch labor is about the most stable, and among the lowest paid, in Western Europe (*CW, April 8, p. 41*). A solid, stable currency and a government actively encouraging foreign investment have also been important in drawing investors.

But by far the most important factor in the appeal of the Netherlands is geographic. Holland is not only a part of the Common Market; it is also to a considerable extent the gateway to and from the Common Market. On the Rhine and the network of other waterways, heavy barges can haul commodities from Holland's North Sea ports, and from most areas inside Holland, to the industrial heartland of Europe—Germany's Ruhr, and beyond to Germany's industrial centers at Hanover, Frankfurt and Mannheim and to eastern France, Belgium and Switzerland (*map, p. 57*).

Holland's waterways now run a total of 5,000 miles; ships with a deadweight capacity of more than 80 tons can navigate on 2,800 miles of this system, while 930 miles are open to vessels of over 1,000 tons.

These canals will become even more important as plans for developing Europe's waterways are completed: widening the Meuse at the bottleneck north of Liege, Belgium; canalizing the Moselle in France; making the Neckar navigable as far as Stuttgart; and connecting the Rhine, Main and Danube rivers, linking Rotterdam with southeastern Europe.

Backing up Holland's waterway system is a good network of railroads and highways.

Port of Entry: The gateway to this vast inland waterway is Rotterdam, which has become the largest port in Europe, and second in the world only to New York. At the mouth of the Rhine and Meuse rivers, and connected to the North Sea by the deepwater New Waterway, the port of Rotterdam each year handles about 23,000 oceangoing ships and some 200,000 inland waterway carriers.

To provide for growth, the "Europort" area is being developed. This will extend the dock area almost out to the sea, add about 2,300 acres of industrial sites, provide berths for tankers and ore ships of 85,000 tons and more.

Added to these physical advantages is Rotterdam's tariff setup, which makes it virtually a free port. Material can be brought in, processed and shipped out, without being subjected to a tariff.

All this, combined with Europe's need to import oil, has made Rotterdam a natural oil port. In fact, it's Europe's largest, as well as its biggest refining center. Capacity of the Shell, Esso and Caltex refineries now totals 22.5 million tons/year.

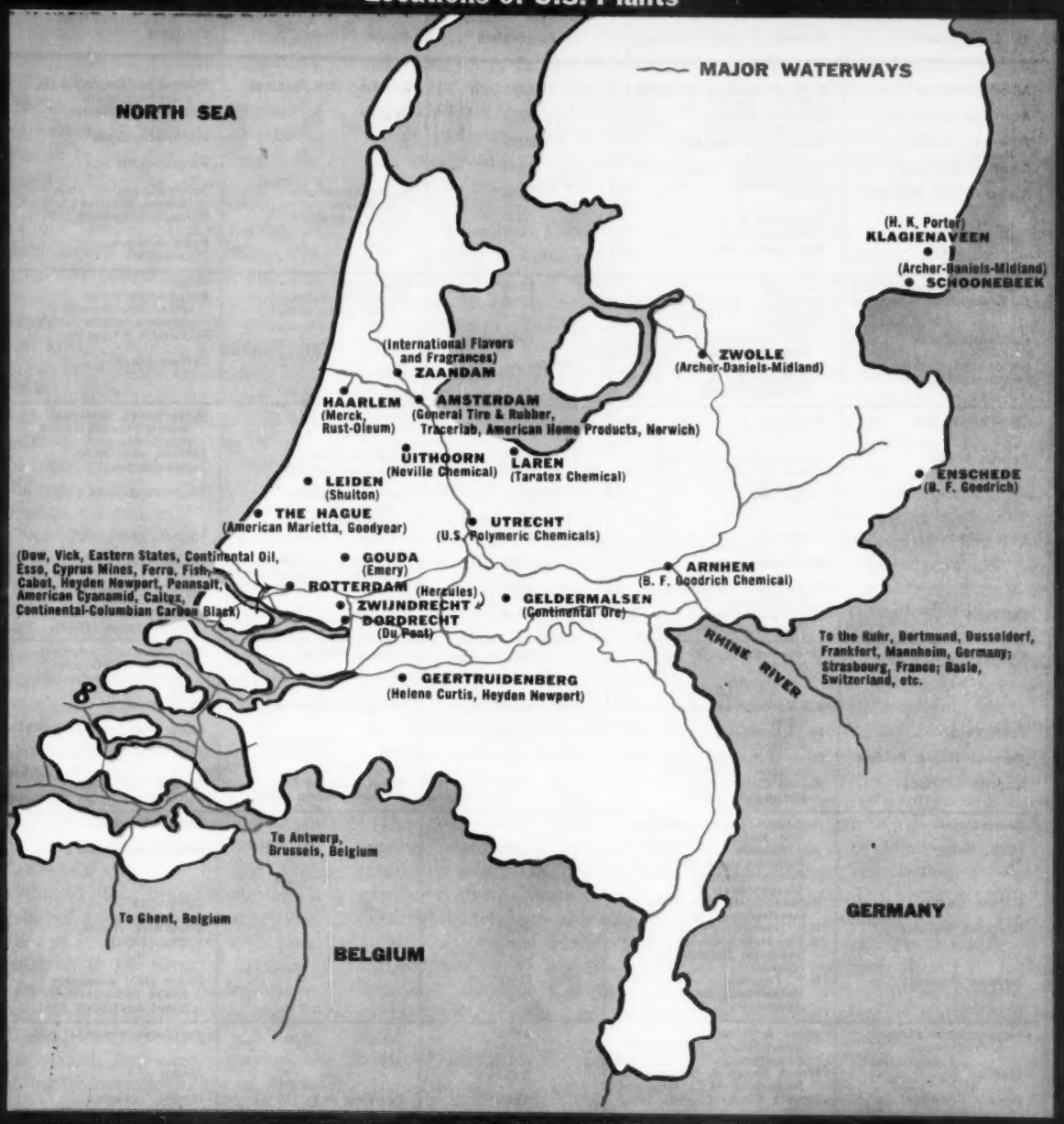
The harbor, the connecting waterways and the availability of petroleum raw materials have combined to provide a powerful attraction to chemical companies, among which are many of the U.S. firms that have set up in Holland. Already along the 30-mile strip on the New Waterway about 50 companies are producing petrochemicals, fertilizer, soap and cosmetics, pharmaceuticals, essences, paint, varnish, enamel, edible oils, industrial gases, and other products. Their output is valued at an estimated 500-600 million guilders/year—more than one-sixth of Holland's total output.

Amsterdam, Rotterdam's rival city, also hopes to attract some chemical investment, to help make up for the business that was lost in the East Indies. Under a plan aiming for completion by '75, Amsterdam is filling in more land for industrial sites, enlarging its seaway, rebuilding its port facilities to handle cargo ships of up to 100,000 tons. A total of some 7,500 acres have been set aside for harbor basins, warehousing and industrial sites, including some 2,900 acres for industries on deep waterways. Already earmarked is a 580-acre area for a refinery of up to 5 million tons.

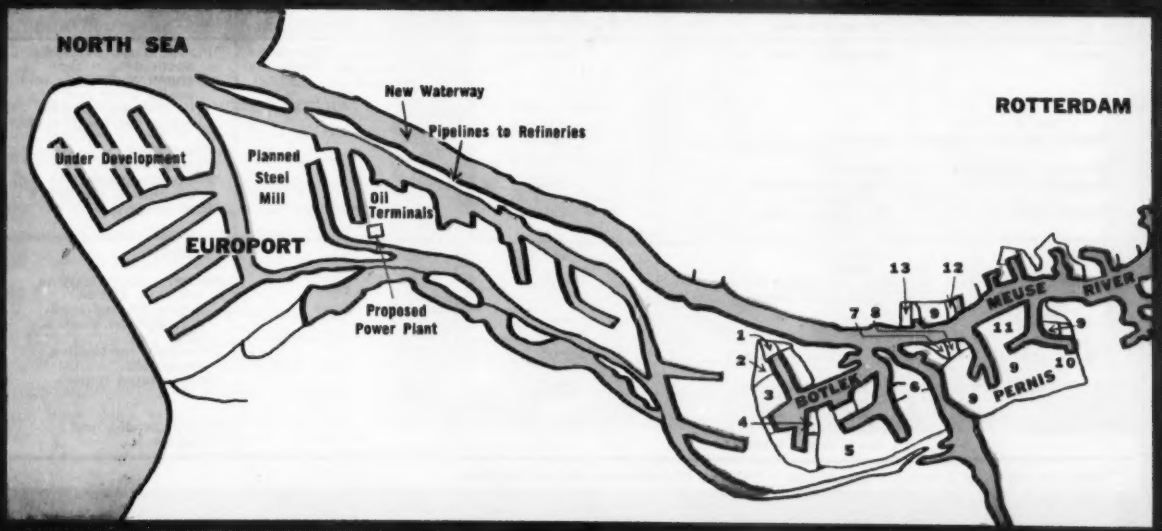
A few weeks ago, Amsterdam's port director completed an industry-wooing journey across the U.S., reported that negotiations were going on with a major petroleum company to build the projected refinery and

1.	Billiton-Albatros—titanium dioxide
2.	American Cyanamid-Ketjen—catalysts
3.	Dow-State Mines—phenol
4.	Continental-Columbian—carbon black
5.	Esso refinery—aromatics
6.	Dow—styrene-butadiene latex
7.	Albatros—superphosphate, sulfuric acid
8.	Fabriek v. Chemische Producten-Vondelingenplaat, Pennsalt — industrial chemicals, intermediates, etc.
9.	Shell refinery and Shell Nederland Chemische Fabrieken — styrene-butadiene rubber, glycerin, detergents, PVC, etc.
10.	Shell - Montecatini — polypropylene; Mekog-Shell—diammonium phosphate
11.	Caltex refinery—sulfur extraction
12.	Unilever—acid oils, fatty acids, glycerin, etc.
13.	Delta Chemie—fertilizer

Locations of U.S. Plants



Rotterdam's Growing Chemical Complex



U.S. Companies in the Netherlands

U. S. Company	Subsidiary and Location	Established	Dutch Partner	Products
Allied Chemical	N. V. Chemische Industries Synres, Hoek	1961	Acquired 50% interest	Resins; building phthalic anhydride plant
American Cyanamid	Cyanamid-Ketjen, Rotterdam area	1958	Ketjen	Petroleum catalysts
American Home Products	Wyeth Laboratoria, Amsterdam	1956		Pharmaceuticals
American-Marietta	Stoner-Mudge (Nederland), The Hague	1955		Varnishes for tins
Archer-Daniels-Midland	Zwolle	1956*	Scado Kunsthars-industrie	Synthetic resins, plasticizers, plastics
	Alchemica N. V., Schoonebeek	—	Through Scado	Phthalic anhydride (1961)
	Geertruidenberg		Necof*	Paint vehicles, castor oil
The B. F. Goodrich Co.	Enschede	1946*	Bredestein	Tires
B. F. Goodrich Chemical	Chemische Industrie AKU-Goodrich (Ciago), Arnhem	1958	Algemeene Kunstzijde Unie (AKU)	Butadiene-styrene latex, high-styrene polymer, nitrile latex
California Texas	Caltex Petroleum Mij., Rotterdam area	1948		Petroleum products
Columbian Carbon Continental Carbon	Continental-Columbian Carbon N. V., Rotterdam area	Onstream 1960		Carbon black
Continental Ore	Basref N. V., Geldermalsen	1960	Chamotte (60%)	Refractories, including magnesite, chromium magnesite
Cyprus Mines	Albatros Sulphuric Acid and Chemical Works Ltd., Rotterdam area	1960	Albatros Superfosfaatfabrieken	Sulfuric acid under construction
	Rotterdam area	—	Through Albatros Sulphuric, with The Billiton Co.	Titanium dioxide (1962)
Dow Chemical	Dobeckmun Overseas Ltd., Amsterdam	1954		Metallic yarns
	Rotterdam area	1960	Through Dow Chemie AG, with Staatsmijnen	Phenol (1962)
	Nederlandsche Dow Mij. Rotterdam	1960		Styrene-butadiene latex (1961)
Du Pont	Du Pont de Nemours Nederland, Dordrecht	1959		Orlon (1961); Delrin acetal resin (1962)
Emery Industries	Unilever-Emery N. V., Gouda	1960	Unilever (50%)	Oleochemicals polymerization—plasticizers, synthetic lubricants, etc.
	K.S.K. Gouda-Apollo, Gouda	1960	Through Unilever-Emery	Fatty acids
Ferro Corp.	Ferro Enamel, Rotterdam	1930		Paints and enamels
General Tire & Rubber	General Tire & Rubber Co. Holland, Amsterdam	1952		Tires
Godfrey L. Cabot	Ketjen Carbon Ltd., Rotterdam area	1938	Royal Sulfuric Acid Works Ketjen (60%)	Carbon black
Goodyear	Goodyear (Nederland) N.V., The Hague	1959		Retreading tires
H. K. Porter	N.V. Fabriek voor Remvoeringen en Frictiemateriaal, Klazienaveen	1959		Friction materials
Helene Curtis	Helene Curtis (Europa), Geertruidenberg	1955		Cosmetics
Hercules Powder	N.V. Hercules Powder, The Hague (headquarters) Zwijndrecht (plant)	1925		Rosin size; resins, etc. (1961)
Heyden Newport	N.V. Transicol, Rotterdam, Geertruidenberg	1960†		Paper size; paramenthane hydroperoxide plant onstream 1961
International Flavors & Fragrances	Polak & Schwarz International N.V., 1959 Zaandam	1959		Perfumes, essential oils
Merck	Merck Sharp & Dohme Nederland N.V., Haarlem	1954		Drugs
Neville Chemical Co.	Neville Cindu Chemie N.V., Uithoorn	1959	Teerunie N.V. (50%)	Resins, solvents
Norwich Pharmacal	Orgahell N.V., Amsterdam	1960	Local minority interests	Nitrofurans
Harshaw Chemical	L. van der Hoorn Chemische-Technische Industrie N.V.	1960*	Acquired majority share	Electroplating chemicals
Pennsalt	Rotterdam area	1960*	N.V. Fabriek Chemische Producten Vondelingenplaat	Plastic films, dyestuffs, pesticides, rubber chemicals, formic and oxalic acids and derivatives, organic sulfur compounds, etc.
Pittsburgh Plate Glass	Agreement to study joint venture	1960	AKU	Glass fiber
Polyvinyl Chemicals	Waalwijk			Polymers
Richardson-Merrell	Vick International N.V., Rotterdam	1961** 1957		Pharmaceuticals, chemicals, cosmetics
Rust-Oleum	Rust-Oleum N.V., Haarlem	1959		Rust preventives
Shulton	Shulton N.V., Leiden	1955		Cosmetics
Standard Oil (N.J.)	Esso Nederland N.V., Rotterdam area	1956		Refinery; plant to make benzene, xylene, xylene related products due on stream 1963
Tanatex Chemical	Tanatex (Holland) N.V., Laren	1958		Chemicals for textiles, paper, etc.
U.S. Polymeric Chemicals	Polymeric Chemicals (Nederland) N.V., Utrecht	1957		Plastic-coated papers
W. R. Grace	Dewey and Almy (Nederland) N.V., Rotterdam	1958		Plastic articles and chemicals

* Acquired minority interest. † Purchased. **Plans to build majority-owned plant

possibly adjacent petrochemical units.

Old Lines: Obviously, a heavy inflow of foreign investment into a relatively small country is bound to have an impact. For one thing, it has contributed to the Dutch chemical industry's rapid postwar growth.

From '38 to '59 the number of establishments rose from 200 to 600. From 100 million guilders/year just after the war the industry turnover (which includes refinery products) grew to 4,500 million guilders ($1.18 billion) in '59, while exports rose from $13.5 million/year to more than $625 million. (The chemical industry has made remarkable strides throughout much of Europe, of course. Holland today still ranks fifth in European chemical production.)

New Base: At least as important as the impact of U.S. investments on the Dutch chemical industry's size has been the impact on its structure.

Until the current period, Holland's chemical development had been shaped in large part by two major factors: its raw materials and its waterways.

Holland's oil reserves are large enough to supply about 25% of its domestic requirements. But local refinery products didn't become available as petrochemical feedstock until after World War II.

Holland has been producing a trickle of natural gas for some time, although scarcely enough to become significant to the chemical industry.

But early last year Nederlandsche Aardolie Mij., the 50-50 subsidiary of Standard Oil (New Jersey) and Royal Dutch/Shell, discovered an enormous gas bubble near the village of Slochteren, in the northern province of Groningen. Its size is being kept a secret, but it's evidently large enough to upset the entire energy picture in Western Europe.

The Dutch government is keeping the bonanza bottled up until it decides what should be done with it. It seems certain that part of it will be set aside for petrochemical feedstock, in line with the government's policy of upgrading the value of production and exports. Meanwhile, State Mines has decided to build a plant at Delfzijl, near the gas fields. Products will be fertilizers and possibly plastics.

But so far the basic local raw materials used by the Dutch industry have been coal and salt. Holland has large reserves of bituminous coal, of low sulfur and phosphorus content and extremely high percentages of volatile materials. And Holland has salt—enough to supply the world's 25-million-tons/year demand for 100 years.

Heavy Chemicals List: With these raw materials at hand and with its waterways giving it a shipping cost advantage, Holland's chemical industry developed to a considerable extent along the lines of least resistance—as heavy-chemical supplier to the rest of Europe. This has discouraged vertical integration within the principal companies.

Dutch State Mines, for example, the Netherland's biggest chemical producer ('59 sales: $171.5 million, including $60.5 million in fertilizers and chemicals) built up its chemical business on coal by-products. Its yearly output of 900,000 tons of nitrogenous fertilizers makes it one of world's eight biggest producers. Royal Netherlands Salt Industry, No. 3 chemical producer (after Shell), built its business on salt electrolysis, has also become a major factor in fertilizers (it bolstered this part of its business by acquiring Albatros in '59).

The Netherlands' ideal transport position helped make superphosphate production one of its leading industries, even though the rock must be imported. Its six plants have an annual capacity of 1 million tons; it exported 420,000 tons in '59 (valued at more than $12 million), making it the world's No. 2 exporter of this material.

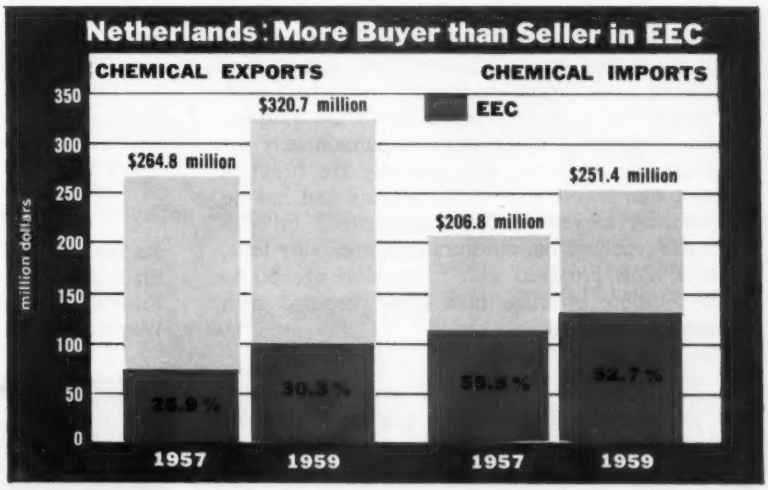
Heavy chemicals, of course, are not all there is to the Dutch industry. Pharmaceutical production has become important since the war. Paint, plastics, synthetic fiber and rayon, soap and detergents production also account for a sizable share of Dutch chemical output.

New Lines: Two basic trends in the Dutch chemical industry today are the development of petrochemicals and the integration of product lines within companies. In the forefront has been Royal Dutch/Shell, through its chemical subsidiary, Shell Nederland Chemische Fabrieken. And contributing heavily to these trends have been the activities of the investing U.S. companies.

Shell started petrochemical production in '47 with sulfur extraction at the Pernis refinery. Since then it has moved into a large range of products, including synthetic detergents, glycerin, styrene-butadiene rubber, resins and plastics.

Other Dutch companies have been integrating and shifting to petroleum sources. State Mines, for example, started producing polyethylene in '59, later built a petroleum steam cracker to supply ethylene (from Esso feedstock). Its phenol venture with Dow will be another step toward integration, since State Mines will use its share to make caprolactam.

Other Dutch-U.S. ventures point the same way. Examples: Allied's Synres phthalic anhydride plant, the Emery-Unilever purchase of a fatty acids producer, and the Cyprus-Albatros sulfuric acid plant, which will supply the partners' titanium dioxide and superhosphate production.



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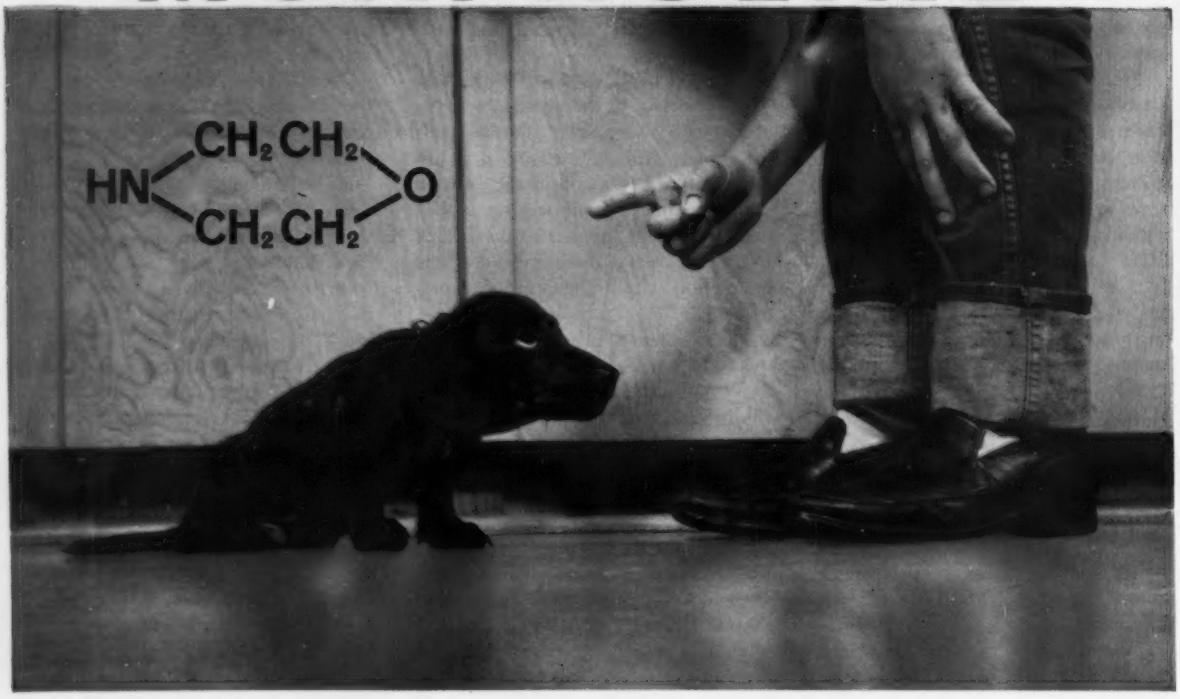

Morpholine gives self-polishing waxes their two most important qualities

High gloss and *water resistance,* the two most essential characteristics in good self-polishing waxes, are achieved with morpholine-based emulsifiers. Higher gloss generally depends on fine emulsions, while coarser emulsions yield dull surface coatings. Emulsions prepared with morpholine are distinguished by their stability and small particle size . . . most are less than one micron in diameter.

Superior water resistance in waxes results from morpholine having a volatility approaching that of water. When the loosely bound fatty acid-morpholine compound breaks down, the morpholine component evaporates at approximately the same rate as water. Consequently the resultant wax film is left void of morpholine and has no tendency to re-emulsify when wetted. In both water repellent and moisture impermeability tests, wax films prepared with morpholine are 50 to 60% more effective than films prepared with nonvolatile soaps.

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Boiling range, ASTM, °C.	
IBP:	126.0 min.
DP:	130.0 max.
Purity, wt. %	98.0 min.
Color, Pt-Co scale	15 max.
Water miscibility	
10 cc. in 90 cc. water	No turbidity

SELECT PROPERTIES

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Flash point, °F., (open cup)	100.0
Freezing point, °C.	-4.9
Weight, 20°C.	8.3 lbs./gal.

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002

Space-Age Fiber Goal: Strength at 2000 F

Fibers and fabrics that retain high strength above 2000 F are being sought for space uses. Under study: ceramics, special alloys and refractory metals, siliceous fibers, carbonaceous residues.

Military needs for fibers and fabrics that retain significant strength at high temperatures (1500-2500 F and above) are keeping a number of laboratories around the country buzzing, pushing ahead on government research contracts. Among the most recent developments: an Eastern firm is expected to be producing commercial ceramic fibers this year; Bjorksten Research Laboratories (Madison, Wis.) reports continuous drawing of quartz fibers with tensile strength of 600,000 psi.; and Fabric Research Laboratories (Dedham, Mass.) says it should have textile-quality metallic yarns within a matter of months.

Parachutes for slowing down space vehicles on re-entry are major goals of this research. Jet pilot parachute packs and other high-temperature inflatable items also require such fibers. And, once developed for the government, these fibers undoubtedly would eventually find industrial applications, such as in protective clothing and laminated structures.

Among the many materials being tried: oxygen-resistant alloys, pure metals armored with protective coatings, ceramics, quartz and other silica-containing compositions, and high-carbon-content materials. The ideal product would be a continuous filament capable of being spun into textile yarn. Tensile strength above 200,000 psi. at temperatures above 2000 F is a goal.

A number of serious problems still block the attainment of this goal, however. First, conventional organic textile fibers are not usable above 600 F, and even glass fiber has a limit of about 900 F. The pure high-melting metals are readily oxidized at high temperatures and lose their strength. Oxygenproof coatings are being tried, but they too must be resistant to the high temperatures encountered. And alloys that resist oxygen tend to be less heat-resistant. Forming metals into small enough fibers to yield textile properties (0.5 mil or smaller) is another problem.

High-melting oxides (e.g., alumina) give strong, oxygenproof fibers, but they are generally brittle, are more likely to be used as resin-reinforcing fibers than as textile materials.

Ceramic Progress: Several approaches can be taken to forming a ceramic fiber (*see table*). The two most common—extrusion and drawing from a melt—while workable, are made quite difficult by the high melting points of the materials used. Arthur D. Little, Inc. (Cambridge, Mass.) reports that it has been working with the Massachusetts Institute of Technology on extrusion techniques, and has "met with some success."

Horizons Incorporated (Cleveland), which has reported an alumina fiber with tensile strength of 300-400,000 psi. at 4750 F (*CW Technology Newsletter, June 25, '60*), is understood to have been active in two of the newer approaches: vapor deposition and evaporation of a colloidal hydrosol. The evaporation technique, limited to materials that can be suspended in water, yields amorphous fibers initially. But at about 1400 F, they change to gamma-alumina, which in turn converts into stable, polycrystalline alpha-alumina at 1900 F (over 99.99% pure). A relatively simple, low-cost method, it can be scaled up with little difficulty. The product is a rectangular cross-section fiber. Dimensions: 15x75 microns.

Major advantage of the vapor deposition technique is that the fibers formed are monocrystalline. Whereas the bend strength of polycrystalline alumina drops sharply above 1650 F, that of the single-crystal material actually rises with increasing temperature, after hitting a low at about 950 F. The modulus of elasticity also drops more sharply for the polycrystalline type. General Electric Co. has made alumina fibers for reinforcing use by this method under Navy contract. Basic drawback is that continuous filaments cannot be produced.

While active in these last two techniques, Boeing Airplane Co. has also worked out another: anodic oxidation of pure metal wire to produce the ceramic fiber. Filaments 10 ft. long and 2-5 mils in diameter can be produced from wire of the same dimensions, and equipment size is the

Five Ways to Make a Ceramic Fiber

Evaporation of a colloidal hydrosol	Easily scaled up; gives polycrystalline fiber; material must be capable of forming a suspension in water.
Vapor deposition	Gives exceptionally high-strength, monocrystalline fibers; small-scale operation.
Anodic oxidation of metal wire	Produces ceramic filaments as long as the original wire; can convert complex shapes (e.g., braided filaments); polycrystalline product.
Extrusion of a slurry	Most familiar approach; continuous; tricky conversion of extruded product into desired ceramic form.
Drawing from a melt	Continuous process; would require a vessel made of a higher-melting material; danger of contamination.

NEWS BRIEFS

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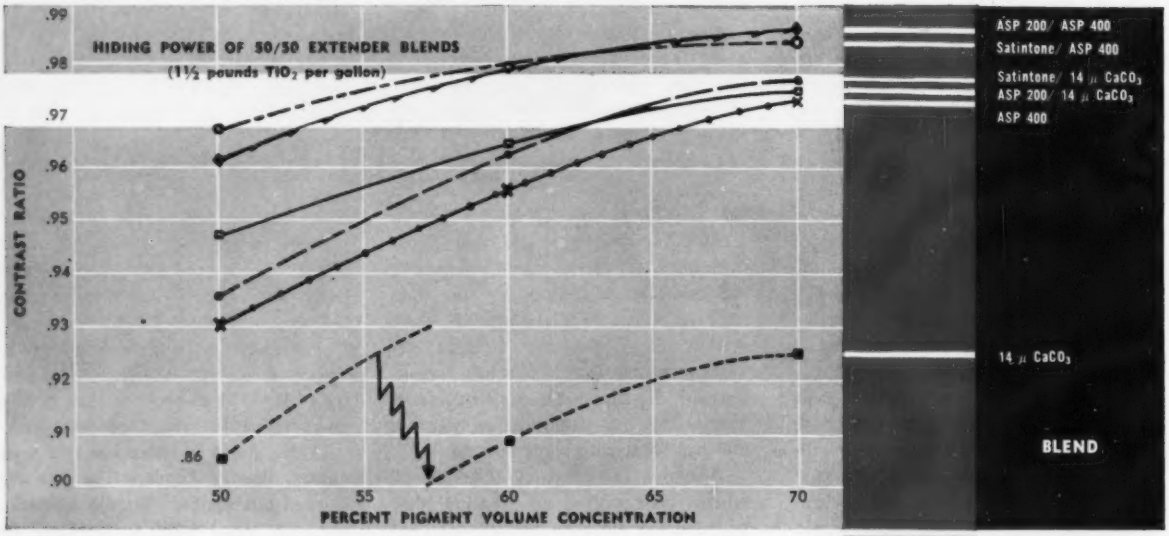

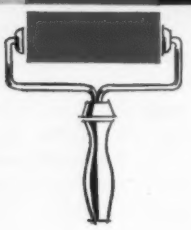

New Paint Pigmentation System

Utilizes High Hiding Power of MCP Paint Extenders

The popularity of water-based latex paints, and the resulting competition among paint makers for a larger slice of the market, has forced paint formulators to look for better ways to produce paints having maximum performance properties at minimum cost.

Recent studies at Minerals & Chemicals Philipp have indicated that MCP paint extenders contribute highest hiding power and that substantial savings in the cost of interior latex paints with top hiding power may be made by following a system which relates performance properties to the *cost* of pigmentation. Various extender blends at several TiO_2 concentrations were examined for contrast ratio (hiding), stain removal, and polishing properties, and the data was graphed. From these graphs the formulator may select a pigmentation best suited to his cost and performance requirements . . . Use the coupon.

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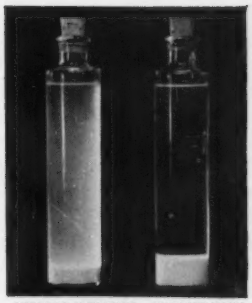

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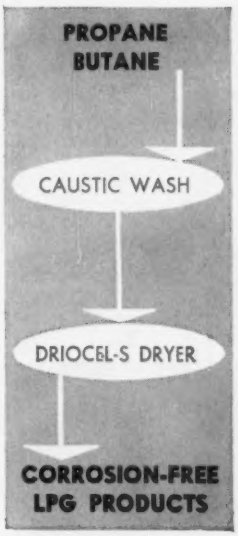

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only limit on the fiber length. An advantage of the method—which gives a polycrystalline product—is its ability to oxidize complex shapes. Alumina rope has been made directly by oxidizing hundreds of braided 3-mil pure aluminum wires, for instance.

A related commercial product is Du Pont's Tipersul, a short potassium titanate fiber that's used mainly in thermal insulation. It melts at 2500 F, is useful up to 2200 F.

Silica Entries: Various high-temperature fibers incorporating silica, either alone or in combination with other oxides, have been made. Bjorksten and General Electric have both been active in drawing continuous filaments from molten quartz (at about 3110 F). Although the product is quite brittle and requires very careful handling (including application of a silicone size to minimize abrasion damage), it has high tensile strength. Bjorksten reported a range of 110-400,000 psi. over a year ago, recently claimed a top strength of 600,000 psi. GE has reported a tensile strength of 517,000 psi. for freshly made quartz fiber, 184,000 psi. for similar fiber taken from a yarn. Silica content is 99.99%.

Insulating silica fibers made from commercial glass fiber (E-type) are available commercially (e.g., H. I. Thompson Co.'s Refrasil and Haveg Co.'s Sil-Temp). These are high-silica (over 96%), heat-resistant fibers made by leaching the glass fiber to remove all nonsilica content and firing the product to redensify it.

Related products under study include the compound silicates. Carborundum Co., for one, has an aluminum silicate product for insulating use (Fiberfrax), and has carried out studies for the Air Force's Aeronautical Systems Division (formerly called Wright Air Development Division) on various silica-containing compounds. Tensile strengths of 138,000 psi. at room temperature and 132,000 psi. at 1500 F were obtained with a material of 82% silica, 8% alumina and 10% baria.

Metal Fibers: Oxidation and stiffness are the two biggest problems facing metal fibers. A. D. Little and Fabric Research Labs have jointly held about $200,000 worth of Air Force contracts to develop metal fibers and fabrics. ADL has worked in the areas of making fine wires from various alloys and in development of coatings and platings to protect oxidizable metal fibers. FRL's work has been in bringing metallic filaments to the textile stage. Since even the finest commercial wires (1 mil) give stiff cloths, FRL has been concentrating on 0.5-mil and smaller wires. Working with commercial nickel-chromium alloys, it has produced filaments of the desired properties, is now working on making textile-quality yarns from them.

The Aeronautical Systems Division has also been doing its own work on 0.5-mil nickel-chromium alloys, reports tensile strengths of 200-300,000 psi. at room temperature, with over 50% strength retention after 10 minutes at 1800 F. It's now working on yarn-making techniques.

Use of unalloyed tungsten or molybdenum is also of interest because of the high melting points of these two metals. However, they must be protected from oxidation.

Linde Co.'s (division of Union Carbide) Crystal Products Dept. is currently drawing single-crystal tungsten boules into 1-2-mil wire with no difficulty, is aiming at lower-diameter materials.

Varied Search: Carbon-containing fibers are not entirely ruled out of the high-temperature field. National Carbon Co. (another division of Union Carbide) is making graphite cloth, and Minnesota Mining & Mfg. Co. has a carbon-containing thermal insulating cloth. The tensile strength of these materials is not outstanding, however.

With continuing interest on the part of the military services in high-strength, high-temperature textile materials, the CPI is certain to be kept busy developing new and improved techniques to produce such fibers and fabrics.

Light Against Heat

Exposed to flying weld splatters, the bulb shown here has a silicone coating that serves as a two-way heat shield. It insulates the glass from damage by the hot, but short-lived, splatters; and it withstands the bulb's high operating temperature (200 C), which previously tried lacquers reportedly had failed to do. The coating is based on a commercially available (but unidentified) silicone resin made by the General Electric Co.'s Silicone Products Dept. (Waterford, N.Y.); the bulb is now available from GE's Large Lamp Dept. (Cleveland).

Electronic Organics

Organic semiconductors have a potentially bright commercial future, according to James Bourland, general manager of American Cyanamid Co.'s Central Research Division.

Speaking last week at the Conference on Organic Semiconductors in Chicago (cosponsored by Armour Research Foundation and Electronics magazine), Bourland compared the state of the art with that of inorganic semiconductors in the '30s. But he noted that intensive research in the field of organics started only in '59, and that it is expected to move ahead faster than the inorganic work did.

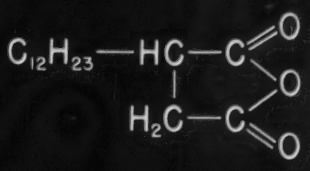
Against the lower thermal stability of the organics, Bourland weighs these potential advantages of organics: variety, availability, low thermal conductivity and simple fabrication.

Research on charge distribution and mobility in organic materials may or may not turn up practical devices for the electronics industry, said William Baker, vice-president and director of research at Bell Telephone Laboratories. But current mysteries such as photosynthesis and bioelectronic communications systems (the brain) may eventually yield to studies of this type.

In addition to reports on the better-known semiconducting organics—such as anthracene and unsaturated polymers (*CW, Nov. 5, '60, p. 103*)—the conferees heard a description of a new class of such materials, salts based on tetracyanoquinodimethan (TCNQ), developed at Du Pont.

New

Hidden Potential Developer!



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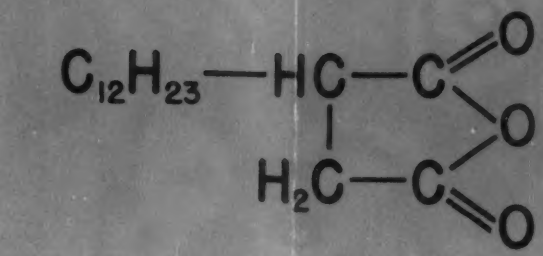

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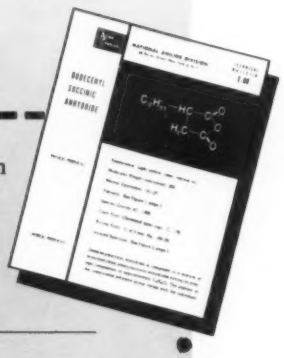

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Technology
Newsletter

CHEMICAL WEEK
April 29, 1961

A project for coking "noncoking" coal is going commercial: United States Smelting Refining & Mining Co. and Stauffer's Victor Division will build a commercial retort adjacent to U.S. Smelting's lead-zinc flotation mill at Midvale, Utah, a few miles south of Salt Lake City. Completion is scheduled for early in the fourth quarter of this year.

The process (*CW, Jan. 16, '60, p. 40*) was developed by U.S. Smelting. Essentially, it's a treatment of low-grade Western coals with natural gas. The carbon in the coal is reduced to coke and the natural gas is thermally decomposed, contributing more carbon values and generating hydrogen as a by-product. Also produced as a by-product are 45-50 gal. of coal oils and tars per ton of coal processed.

Victor, which needs coke for its phosphorus furnaces at Silver Bow, Mont., will be a "substantial customer" for the plant.

Opening up the vast—but now largely unusable—reserves of Western coal could mean tremendous savings for phosphorus producers in the area. Now they are forced to haul coal for distances up to 1,500 miles. It could have ramifications in other applications and in other countries, too. In Mexico, for example, it would enable exploitation of coals found close to iron ore deposits.

This same type of thinking has been apparent to others, of course. Food Machinery has been working on such a project for some time and, with U.S. Steel, is operating a $3.5-million demonstration plant at Kemmerer, Wyo., capable of making 250 tons/day from 500 tons of low-grade coal. This plant is currently in the shakedown phase, expects to supply samples this year. Not much is known about the process except that it's a two-stage method and does not involve by-product recovery plans.

•

Lukens Steel is ready to roll titanium-clad steel plate for process equipment after several years' development (*CW, April 13, '57, p. 27*). The plate, made by the Coatesville, Pa., firm, will be about 25% cheaper than solid titanium. It can have a 3/16-in. maximum thickness of titanium with a steel backing of low-alloy steel containing molybdenum and chromium to slow the formation of troublesome titanium-iron intermetallic compounds. Total plate thickness can be between ¼ and 1¼ in.; total plate width, between 48 and 96 in., with lengths three times the width.

Lukens is the second firm to offer titanium clad. Chicago Bridge & Iron (Chicago) produced two clad vessels about two years ago using its Hortonclad vacuum-bonding process. The Hortonclad process relies on a silver-inlay strap joint. Lukens rolls its clad to produce the bond, uses an argon flush to create an inert atmosphere.

The CPI seems ready to pay the price of titanium clad equipment now that titanium costs are coming down. Chicago Bridge is fabricating

its third vessel, has three more on order. But economics are still a major factor in choosing the type of construction. Thin sheet lining, anchored by welding with a vanadium interlayer—developed by Titanium Metals Corp. of America (*CW, May 21, '60, p. 61*)—is least expensive. But because of expansion problems, it can't be used for operating temperatures above 250 F.

Heavier titanium clad has the advantage of better heat transfer. Solid titanium offers even better heat-transfer characteristics and, even though it is more expensive, it obviates the need for welding two dissimilar metals during fabrication. Clad welders will probably have to go to some technique such as TMCA's vanadium interlayer method.

•

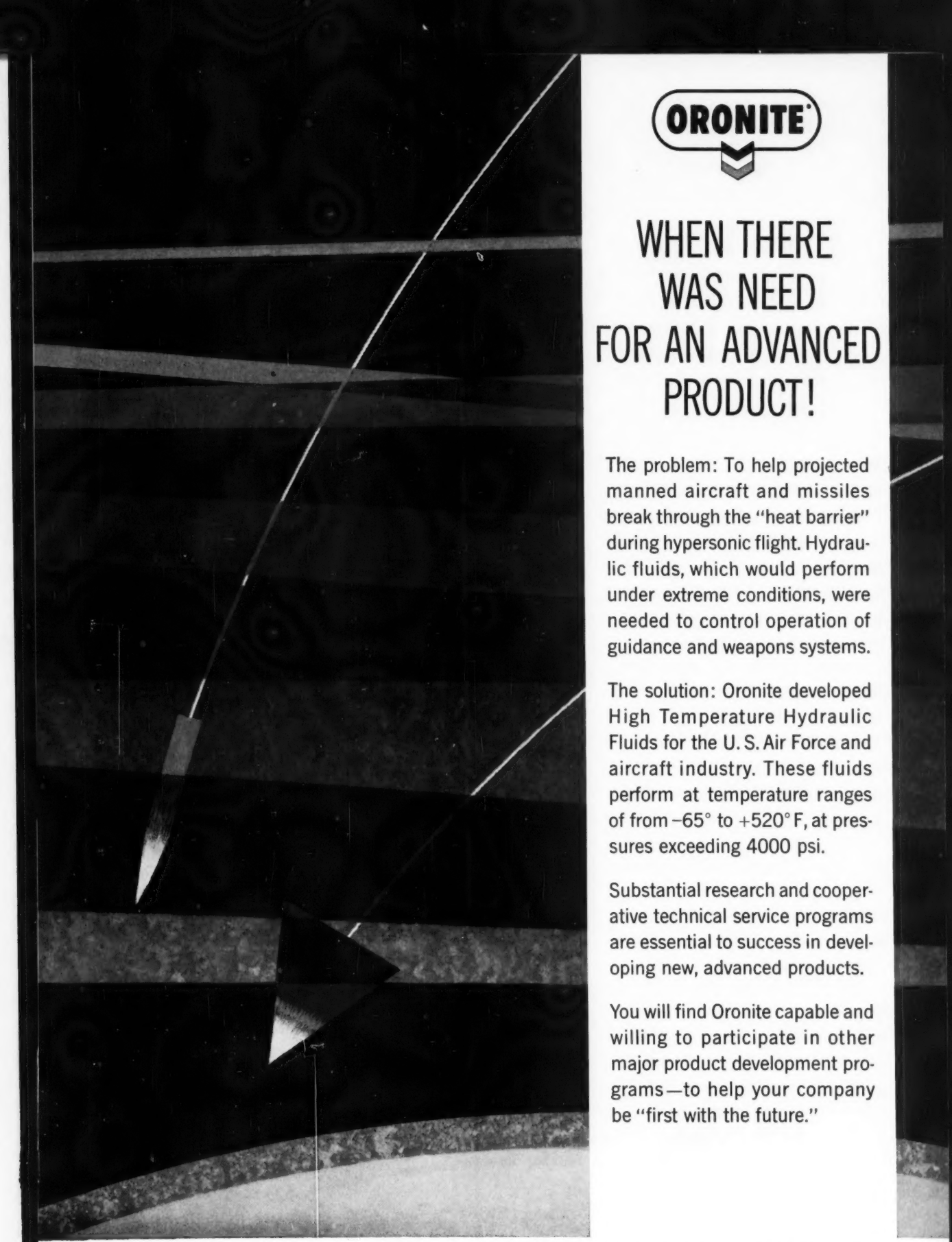
Federal taxes are now being paid by nonprofit laboratories on the portion of their work that is classed as "proprietary"—i.e., done for the exclusive use of a private company, which will turn the work to profit. Stanford Research Institute was among those trying to clear up ambiguities in the tax laws that might have resulted in retroactive taxes being levied. The Internal Revenue Service ruling, effective Jan. 1, should clear up uncertainty on the part of the nonprofits (currently under fire in Washington, *see p. 29*) and muffle to some extent charges of "unfair competition" raised by profit-making labs.

•

Watch for more interest soon in foamed epoxy resins. Shell chemical has been doing considerable work on them, is believed ready to go commercial. Shell at the moment will say only that it has distributed some samples but is not yet ready to talk about plans for large-scale production.

Presumably, however, Shell is grooming them as competition for foamed urethanes. They would have an edge because of lower toxicity in handling, better resistance to moisture and temperature. However, urethanes appear to have an inherent price advantage. Moreover, because urethanes can be foamed with fluorocarbons, they have exceptionally good insulating characteristics. So if Shell views the epoxies as competition for urethanes, it's likely that the firm has found a method of foaming with fluorocarbons or has found some other way of hiking the foamed epoxies insulation value.

De Bell & Richardson (Hazardville, Conn.) has developed a preformed block of foamed epoxy, which is made and sold by an affiliate, D&R Pilot Plants. The material is sold under the tradename Du Raform. And Minnesota Mining and Manufacturing has two Scotchcast foamed epoxies: 603, a free-flowing powder, and 601, a two-part liquid system. (This work on foamed epoxies was originally a development of Minneapolis-Honeywell, purchased by 3M.) To date, however, the markets for foamed epoxies has been restricted.



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NEW SLANTS ON HEAT PROCESSING FROM SELAS

what ethylene producers are doing about increasing capacity

The domestic demand for ethylene, largest-volume olefinic raw material produced by the petrochemical industry, continues to grow at a substantial rate. Over a four-year period (1955-'59), production capacity for ethylene skyrocketed from a little over three billion to a 5.6 billion pounds per year. And the plateau for this fast growth rate is nowhere in sight. Conservative estimates indicate that by 1965, ethylene capacity in the U.S. will have reached a rewarding 7.1 billion lbs./year.

Giving life to this tremendous growth in production capacity is the cracking furnace. In many petrochemical plants throughout the United States, the cracking furnaces were designed and built by Selas.

The record shows that Selas supplied 47.5% of the total ethylene production capacity, from all sources, in the 1955-'59 period. This represented 79% of the furnaces designed and constructed by firms other than the petrochemical companies' own engineering staffs. The 31 Selas GRADIATION® furnaces installed from '55 to '59 corresponded to a total ethylene cracking capacity of 1.2 billion pounds. In 1960, Selas sold or installed cracking furnaces representing additional ethylene production capacity of 0.96 billion pounds or 80% as much capacity as Selas sold and installed in the previous four years.

The acceptance of GRADIATION furnaces for ethylene production is exemplified by repeat orders. In the past eight years, one leading ethylene producer has —on nine different occasions—purchased a total of 17 Selas GRADIATION cracking furnaces. Two other petrochemical plants have each installed 11 furnaces. Each made four separate purchases to reach their present production capacity.

As the human heart adjusts to the varying demands of the body, so are Selas GRADIATION furnaces adjusted to changes in ethylene production dictated by competitive pressures. The Selas furnace, for example, permits cracking of ethane, propane, butane or naphthas by simple, easily-made adjustments in the patented radiant heating pattern. This flexibility—combined with the uniformity of heating and controllability of Selas furnaces—allows ethylene producers to obtain optimum yields from varying feed stocks, and to balance their production economically against changing marketing situations.

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THE $45-MILLION/YEAR HOUSEHOLD ADHESIVES MARKET

- **Competition is fierce now and will become even hotter. Some new company names will soon be entering the field if plans materialize.**
- **But the market is growing. And outlets are changing as marketers find the lady of the house becoming a more important sales factor.**
- **Products reflect the competitive nature of the business. Polyvinyl acetates are on top of the heap now, but epoxies are coming on fast.**

Home Glues: Surge in Sticky Specialties

One of the most prosaic of consumer supplies, household glue, has become one of the hottest, most fiercely fought over items in the specialties field. New companies, new products in fancy packaging, and new raw materials are radically changing the makeup of this $45-million/year U.S. market.

Many factors have conjoined in recent years to make household adhesives a fast-climbing field. The do-it-yourself trend, increased use of plastics that call for new types of adhesives, more boating activity, and the rise in the number of school-age children—lavish users of cements for hobbies and school projects—have all contributed. The move to the suburbs with the attendant rise in home ownership is also helping push household adhesives. And with the development of specialty glues, such as the epoxies, which cost almost 50¢/oz., the sales curve is upward in both sales and volume.

What's in Them? Polyvinyl acetate is the base of the top-selling household adhesives today and probably accounts for about 50% of the entire market. Usually formulated in combination with polyvinyl alcohol and plasticizer, polyvinyl acetate products are sold mostly in squeeze bottles and come closest to an all-purpose glue in the U.S. household. Borden Chemical Co. (New York) is by far the major seller of this type with its Elmer's Glue-All.

Competition in the polyvinyl acetates has become the province of larger companies, such as Borden, LePage and United States Plywood, and will probably continue to remain so in the foreseeable future. Reason: retailers expect manufacturers to presell their product, and only big companies can afford to do this.

Great Expectations: Epoxies appear to have potential for fastest growth in the household field, but many marketers don't think epoxies will really spurt until some firm comes up with a one-package system that's easy to use and provides long pot-life. The top-selling epoxy adhesives now are the two-tube systems, which call for a one-to-one ratio of glue and catalyst. Attempts to use a single tube with a single component at each end have not been very successful, nor was the idea of putting a cotter pin in the tube—the pin was pulled out to let the ingredients mix.

The number of small companies turning out epoxies and epoxy-plus-metal powder-filled products makes the market for epoxies seem larger than it really is. Epoxies' share of the market now might be pegged at about 5-7%, and most marketers look for them to snare about 10% of the consumer market in the next few years. The recent entry of Borden's Elmer's Epoxy Glue and the expected entry of U.S. Plywood and possibly Du Pont may help to change the picture.

Contacts Climbing: One of the top-volume items in the household glue field is the natural and synthetic rubber-based adhesives called "contact" cements. They are sold by a number of companies, including U.S. Plywood, Borden, Franklin Glue Co. (Columbus, O.), Carter's Ink, and Goodrich. Do-it-yourself furniture building has boosted this product's sales. Also, they're used in larger quantities per application than are other glues.

Another widely used household adhesive is the clear cellulose type. Du Pont's Duco Cement, on the market since 1924, is by far the biggest nitrocellulose adhesive in the consumer field. Others are LePage's Household Cement, Tester's, and Franklin's Household Cement.

Although animal and fish-type glues are rapidly being replaced by synthetics, they are still used for gluing wood, leather and textiles. One, doing well in some markets, is called Instant Grip, made by Consolidated Chemical Co. (Pittsburgh, Pa.). It is aided by high-powered promotion.

TV demonstrations give the public the impression that this product represents a chemical breakthrough. Sales have jumped in the areas where the product has been demonstrated.

Smaller segments of the household glue field are held by urea-formaldehyde products, resorcinol and casein adhesives, and pastes and mucilages.

Who's in the Field: Along with changes in formulation has come entry of many new companies into

the field. Before World War II a few companies, such as Du Pont, Franklin and LePage, shared the big portion of the business. Now others, including Borden Chemical, U.S. Plywood (Weldwood Products) and Plough, Inc., have entered the picture, radically altered the industry's makeup.

Borden is probably the country's top supplier. Its current line of household products (sold under the Elmer's tradename) includes types based on epoxies, casein, resorcinol, urea-formaldehyde, polyvinyl acetate; it has a contact cement, too.

A growing factor in the field is U.S. Plywood's Weldwood line. Currently its consumer products include a polyvinyl acetate, a contact and "super" contact cement, a resorcinol, an epoxy, and a plastic resin glue. The company reportedly doesn't make these products, only markets them.

LePage, which has been in the household glue field for almost 90 years, has undergone some changes in recent years that have somewhat altered its place in the field. The company was family-owned until the mid-'50s, when Johnson & Johnson bought it, only to sell it, in turn, to Papercraft Corp. (Pittsburgh). Best known for its mucilage glue (made from gum arabic), the line has been enlarged in recent years to include a polyvinyl acetate, a clear cellulose, a hide glue, and a white paste. The company is testing an epoxy.

Plough, Inc. (Memphis), though not generally recognized as a significant factor in the field, may be a substantial marketer of these products in the future. Last year Plough bought Webb Products Co. (San Bernardino, Calif.) and with that acquisition picked up a line of almost a dozen different household adhesives selling under the Duratite name. These, plus the Dap line of calking and glazing compounds, which Plough acquired through its '60 purchase of Dicks-Armstrong-Pontius Inc. (Dayton, O.), gives Plough a formidable line.

Not in the market yet but slated for entry in the near future is Morningstar-Paisley, Inc. Vice-President Tom Morningstar tells CHEMICAL WEEK that his company will enter the household field with a line called M-P adhesives. These will be the first consumer products for the 100-year-old New York company.

Big Little Guys: Because of the relatively high profit margins and simple manufacturing needs (mostly repackaging) of the special type of adhesives, many small companies have been able to successfully market these items. Examples of small companies that have prospered in this area are Woodhill Chemical Co. (Cleveland), Chemical Development Corp. (Danvers, Mass.) and Acorn Adhesives (Los Angeles).

Woodhill (*CW, Jan. 28, p. 88*) recently brought out an epoxy glue that sells for $1 for 1½ oz., says it is selling well. The company depends heavily on bubble packaging to stimulated impulse buying. Products carry the Duro name.

Consumer products sold under the Devcon name now account for about 50% of Chemical Development's business. Its first household product, Plastic Steel (98¢/2 oz.), is still the company's best seller. Others are 2 Ton, a tube and tile sealer, and a calking product. Most of its line is epoxy-based but the company is working on new bases for entry into different fields.

Sanford Ink. Co. (Bellwood, Ill.) sells a hard, white, dextrin-based paste, mucilage, rubber cement, and polyvinyl acetate.

One of the most impressive growth pictures in household adhesives has been posted by Acorn Adhesives, which was first, it claims, to market a home adhesive in plastic squeeze bottles. The company is probably the No. 3 seller of polyvinyl acetate glue (after Borden and LePage).

Where They Sell: Outlets for household glues: hardware and variety stores, which each distribute about 25% of the total; stationery stores, 15%; building supply and lumber stores, 10%; grocery stores, 10%; miscellaneous outlets, 15%.

The most promising outlet for the general-purpose, low-cost products are probably grocery stores and lumber stores, especially those catering to suburbanites. Fancier-type products, such as the two-part systems, will continue to find their major outlets in hardware and paint stores. Another growing outlet: marine supply shops.

With so many companies now in the field or about to get in, the objective of glue marketers seems not so much to grab a bigger share of the pie but to get people to use more glue. This has taken the form of increased consumer education, often included in advertising, and more use of attractive packaging—e.g., bubble packaging on stiff boards.

Stuck with Success: The future for household adhesives looks promising, both in terms of volume and dollar gains. The market should prove attractive for companies looking for new products. Those already in the field have, based on recent performance, good reason for sticking with it.

Regulations, Records

The Kennedy Administration last week revealed that it will back a cosmetics pretesting law. Although the beauty business has been faced with similar legislation in the past, this is the first time an Administration has given its approval.

A bill, now being prepared by Health Education & Welfare Secretary Abraham Ribicoff, will be submitted to Congress shortly. It will require cosmetics manufacturers to prove the safety of new products before putting them on the market. Under existing law the Food & Drug Administration must bear the burden of proving that a cosmetic is harmful before banning it. Secretary Ribicoff feels, however, that "the burden of proof should be on the cosmetics manufacturer and not on the government."

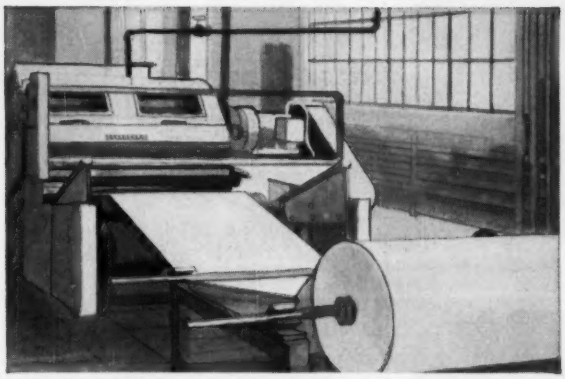
HEW officials expressed hope last week that the bill can be passed without much difficulty. They noted that the food industry did not oppose the Food Additives Amendment when it was under consideration in '58. They said they hoped the cosmetics industry will behave similarly.

On the heels of this development the beauty industry added up its sales, showed that it set another record in '60. Retail sales of perfumes, cosmetics and toilet preparations (excluding soap) climbed to $1.8 billion, a leap of more than 7% over the previous record year, '59.

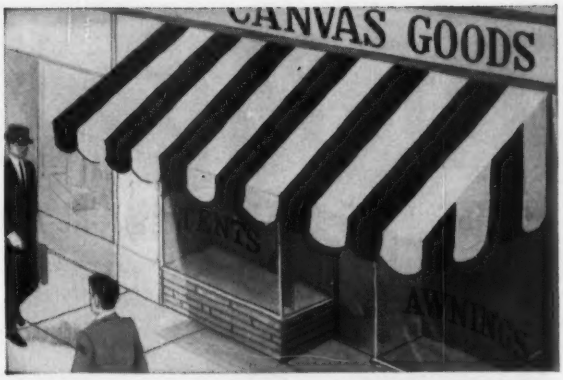
Fragrance products, especially colognes and toilet waters, showed big rises, partly due to the gaining popularity of aerosols. Hair coloring products and eye makeup also did outstandingly well.

Dentrifrice sales were up 3% and shaving cream sales, 8½%.

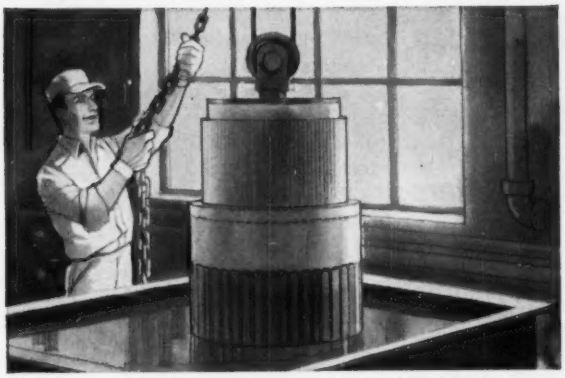
Distribution through food stores and by door-to door companies continued to gain at the expense of drug and department stores and specialty shops.



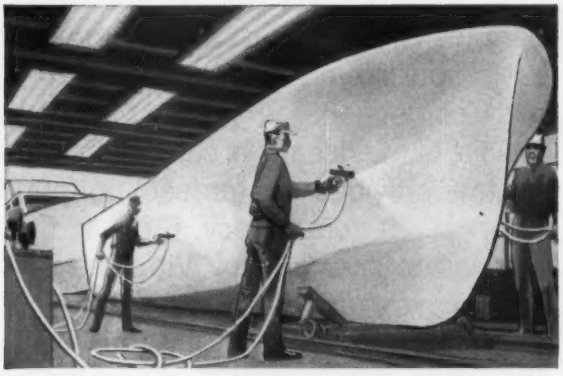
Control uniformity of film thickness in vinyl plastisol and organosol coatings for paper or cloth, with BENTONE 27 or BENTONE 38 gellants.



Control penetration on porous surfaces—the right BENTONE gellant will minimize "wicking" of resin coatings on cloth, paper, concrete.



Minimize sagging and running when dip-coating electrical parts with epoxies. BENTONE gellants help control flow during dip and cure.



Control suspension of pigments, extenders, fillers in polyester gels and gel coats. BENTONE 27 gellant provides thixotropic flow control during application.

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Here are only a few of the many problems you can solve with two BENTONE® gellants—especially those problems involving efficient control of viscosity, particle settling, penetration or flow properties.

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New Wax Challenger

S. C. Johnson & Son, which has long dominated the acryclic floor polish field with its Klear, has a strong new competitor this week. Simoniz Co. (Chicago) is just beginning to hit the market with a new floor wax called Viv, also an acrylic.

Thought to contain solids content similar to the Johnson wax—about 18%—Viv comes in three sizes: 14 oz., which sells for 59¢; 26 oz., 98¢; and 48 oz., $1.60. It went into the first retail markets in March, now has 40% national distribution and expects 80% by the end of May.

Simoniz will stress that Viv is lighter in color, will not discolor floors and is self-polishing. Reichhold Chemicals is reported to be supplying the resin for Viv.

Excepting Klear, most of the polishes using acrylics are manufactured by smaller companies — e.g., Continental Six Month Floor Wax and Butchers Wax. Top suppliers of acrylic emulsions for these products have been Rohm & Haas, Polyvinyl Chemical and Reichhold.

Aerosol Expansion

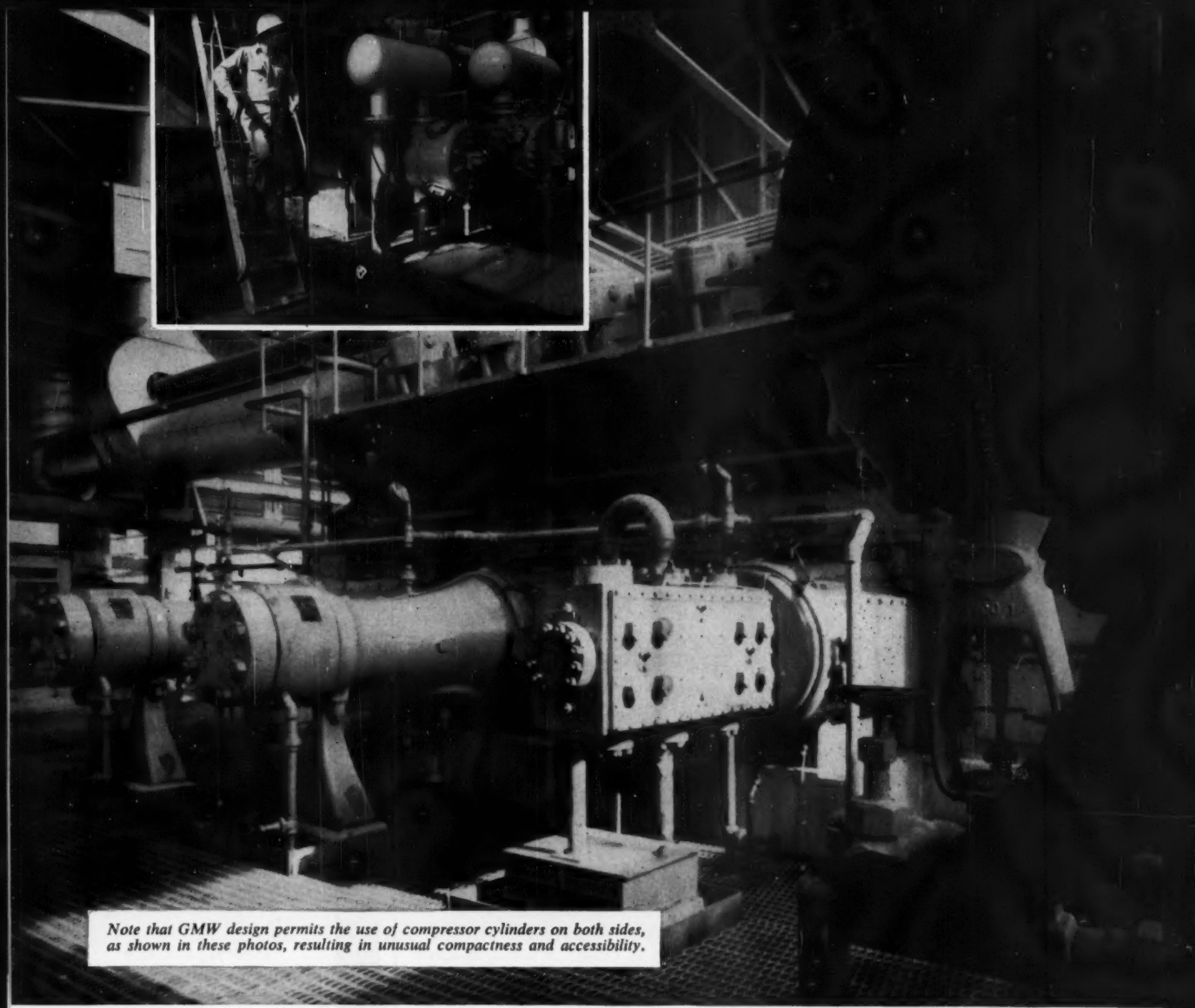
Two Cleveland aerosol firms are racing to put up new million-dollar plants. Plasti-Kote, Inc., has just begun construction of a $1-million spray paint facility that it says will be the most modern in the world, and Sprayon Products, Inc., will build a $1.5-million filling plant to expand its contract loading business.

Plasti-Kote's new operation going up at Medina, O., will have an annual capacity of 50 million cans of spray paint. The 100,000-sq.ft. building will double the company's present capacity. All Cleveland operations will be transferred to Medina when the building is completed in late summer.

Elias Shapiro, executive vice-president of the spray paint firm, says that sales in '60 were up 40% over '59's. He looks for sales of $7.5 million—a 50% increase—this year. In five years, he predicts, sales will reach $20 million/year.

The company is already planning to add to the Medina plant in three years, and foresees branch plants in Los Angeles and Toronto.

Sprayon, a contract filler that also retails a line of aerosol paints, expects



Note that GMW design permits the use of compressor cylinders on both sides, as shown in these photos, resulting in unusual compactness and accessibility.

Report from American Cyanamid, Fortier Plant...

How Cooper-Bessemer gas engine compressors boost synthesis gas for ammonia to 5000 psi

These photos show both sides of one of the two Cooper-Bessemer 2500 hp GMW gas engine compressors at the Fortier Plant of American Cyanamid Company, Avondale, Louisiana. In the production of anhydrous ammonia, these 4-stage units compress 6000 cfm of synthesis gas from 60 psi to a discharge of 5000 psi. The lower view shows the high pressure cylinders; that in the inset shows the low pressure side. The four stages of compression from 60 psi are (1) to 225 psi, (2) to 670 psi, (3) to 1500 psi, (4) to 5000 psi.

The two units have been operating since 1954, 24 hours a day, 340 days a year.

The anhydrous ammonia produced at the Fortier Plant is used by American Cyanamid in the manufacture of acrylonitrile and is sold to fertilizer plants and other chemical companies.

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its plant to have a capacity of 200,000 cans/day when completed in Jan. '62. The 85,000-sq.ft. building in Bedford Heights, a Cleveland suburb, will include three completely automated production lines, and will combine activities of the firm's four smaller plants.

Field Crowding Up

Another company will step into the fugitive dye field (*CW, March 11, p. 66*). Deering Milliken Research Corp. (Spartanburg, S.C.) has developed a new all-purpose line of fugitive tints for use on synthetic and natural fibers.

The company claims that its new tints offer fugitivity never before available for textile processing. The line covers a complete range of colors.

Patent applications have been made and the firm has completed licensing agreements. One of the companies to market the new tints will be Syn-Chem Corp. (Spartanburg, S.C.). It will sell the line under the name of Versatint fugitive tints.

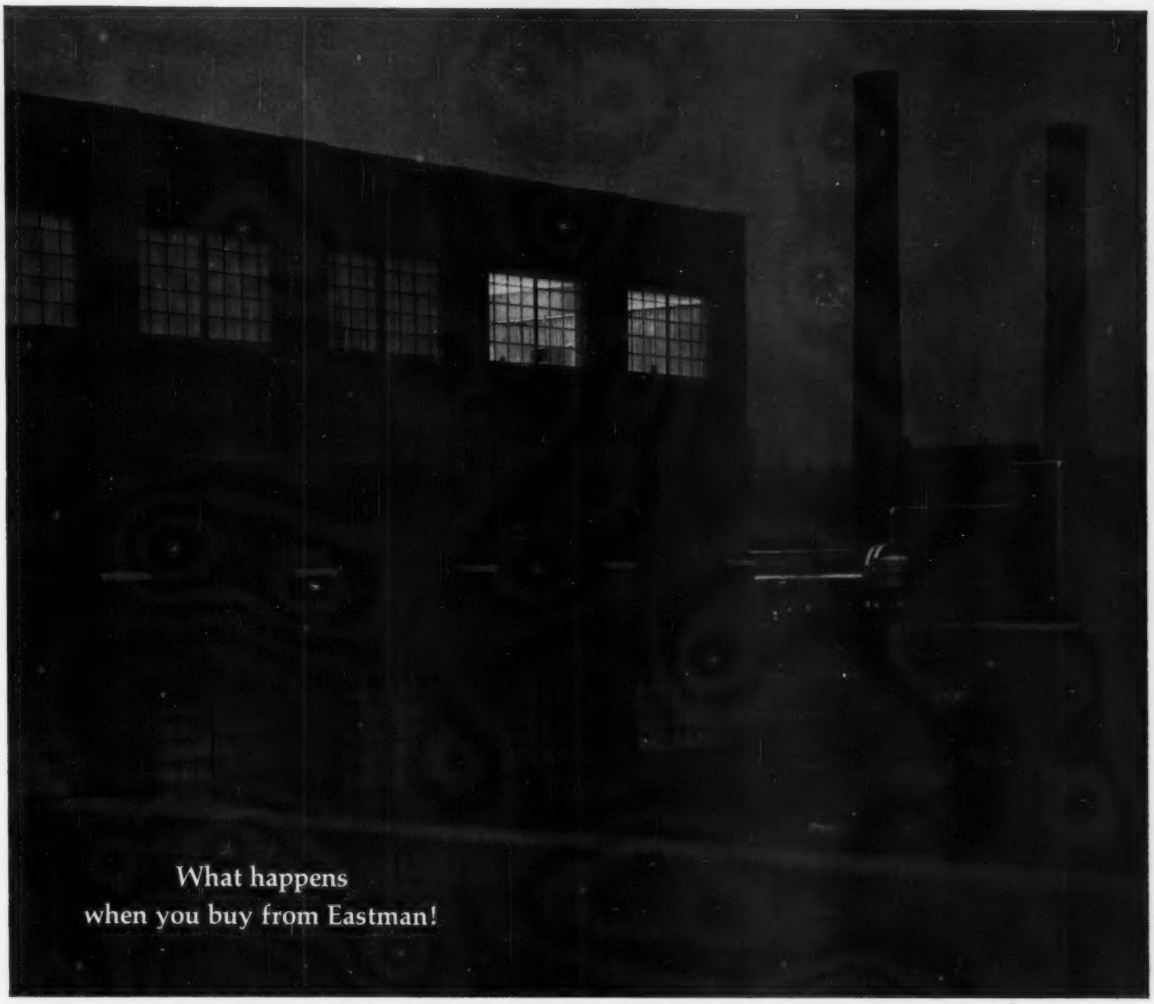
Two other companies have recently entered this growing field. Chemtel Corp. was formed for the express purpose of marketing Tint-Out, a product that was developed by Speedry Chemical Products (Richmond Hill, N.Y.). And Polymer Industries, Inc. (Springdale, Conn.), is selling its Rinse-free Tints.

Stearic Savings

A new grade of stearic acid is now being marketed by Wilson-Martin Division of Wilson & Co. (Philadelphia). Wilmar 272, made by a new, economical process, is said to have the light color, low odor and high heat stability characteristics of cosmetic-grade acid, at a comparatively low price.

Wilson's process has been under development for over four years; patents are now being applied for. The company has been piloting the process for some time, with output being tested in a variety of industrial applications—e.g., candles, esters, emulsifiers, stearates, textile softeners and cosmetics.

Wilmar 272 is available in flake form, packaged in 50-lb. multiwall paper bags, or in bulk (tank car) loads.



Repeat performance

One of our regional sales managers relates the following:

"It was one of those ten of five Friday afternoon phone calls, so you might say I answered... well, guardedly.

"But it turned out to be a customer calling to say thanks for a service we had performed on the previous weekend. His acetone recovery unit had gone "sour," and he had called at about the same time a week past to ask if there was any possible way we could deliver 4,000 gallons of acetone before 8 o'clock Monday morning.

"To make a long story short, we did deliver. Of course it involved extra-schedule crews to clean and load a tank truck on Saturday morning, not to mention late Friday hours for some of the people in our order writing and traffic departments. But, as the customer pointed out while extolling our service at length and my part in it, our extra effort sure saved the day for them by keeping their process going.

"I was just beginning to get a smug, self-satisfied feeling when the customer said: 'Bob, you're not going to believe this, but....'

"He didn't have to say another word. The only thing that worried me was what to say to our production people after repeating to them: You're not going to believe this, but....

"Well all I *could* say was: Can you do it again? And they did. Same customer, same place, before 8 o'clock on Monday morning."

We sincerely hope that this *lightning-strikes-in-the-same-place-twice* situation never happens in your process operations.

But if it does, and you need service fast, give us a call.

Eastman CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE, Subsidiary of Eastman Kodak Company

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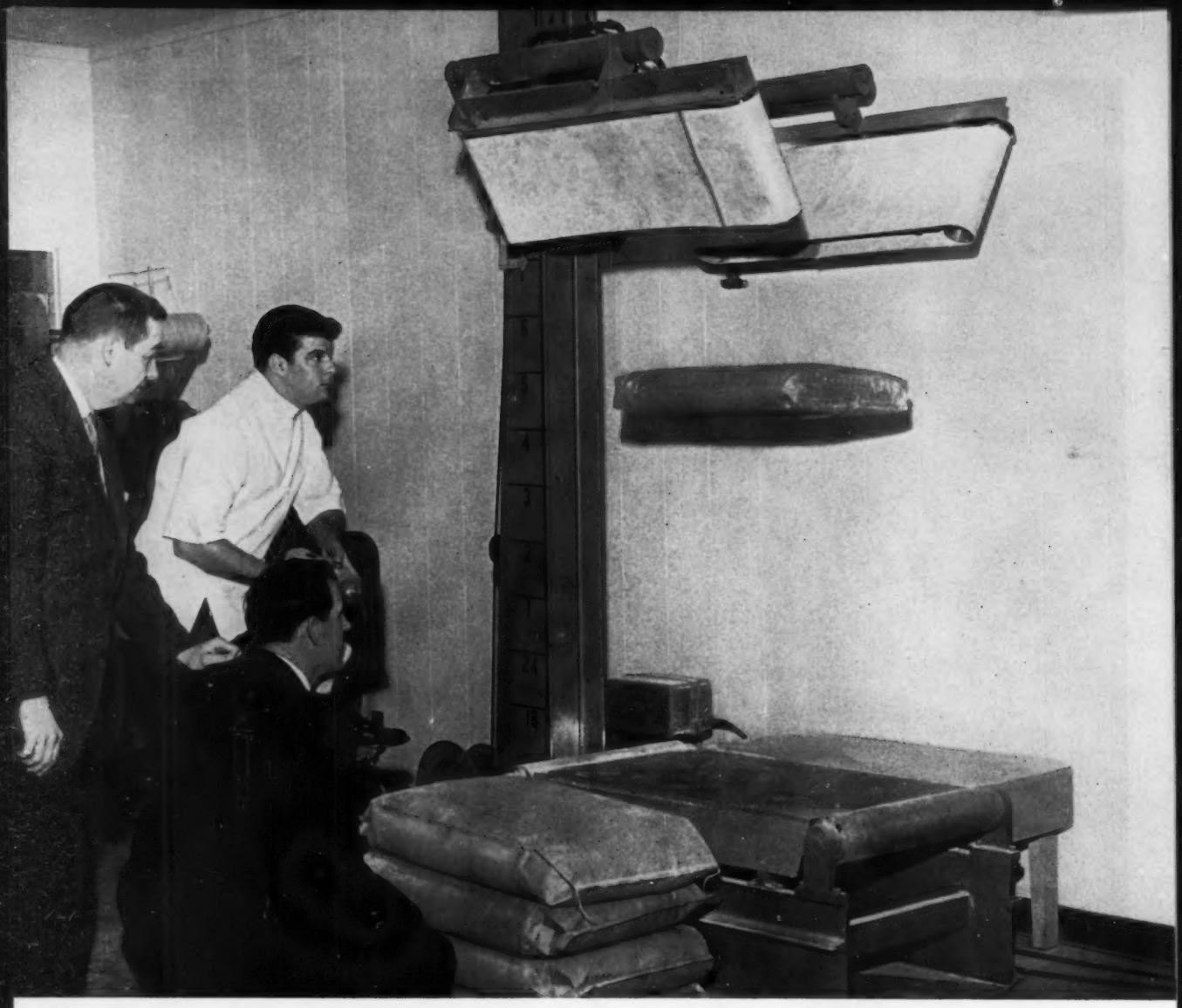
Western Sales Representative: Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Salt Lake City; Seattle.



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Market Newsletter

CHEMICAL WEEK
April 29, 1961

Increased use of cyclohexane in making nylon intermediates may justify erection of a Canadian plant for production of the raw material, says Du Pont of Canada. The time may be ripe when the existing contract with cyclohexane supplier, Phillips Petroleum, expires at the end of '62.

Meanwhile Du Pont has been pressing Canada's Tariff Board to permit duty-free entry of cyclohexane because, the company insists, it must continue to have the raw material at prices competitive with those paid by foreign producers.

Du Pont won't divulge its consumption volume, but Canadian experts think the firm may be buying at least 30 million lbs. of cyclohexane annually at a price somewhat lower than the posted 36¢/U.S. gallon.

•

A 20-million-lbs./year maleic anhydride plant has been completed at Richmond, Calif., by California Chemical Co., subsidiary of Standard Oil Co. of California. Process is licensed through Badger Manufacturing by Reichhold Chemicals.

Ortho Division of CCC will use part of the plant's maleic output for manufacture of agricultural chemicals; this captive outlet—and CCC's relative geographic isolation from other producing areas—may help ease pressure on the company of general maleic overcapacity expected during this year.

•

The sale of government-owned corn to Publicker Industries for production of fermentation alcohol should now meet little criticism from producers of nonfermentation industrial alcohol. Proposals of such sales in the past have been energetically opposed on grounds that this would be subsidized alcohol production (*CW Washington Newsletter, April 30, '60*).

But Publicker Industries—leading corn-for-alcohol proponent—is now able to plead a case of special hardship resulting from President Kennedy's discouragement of Cuban molasses purchases; Publicker reportedly had been ready to buy some 120 million gal. of molasses derived from the current Cuban sugar corp (*CW Market Newsletter, March 4*).

Publicker indicated need for 30 million bu. of corn and hopes to get it at one-third the $1.06 support price. The U.S. Dept of Agriculture notification was worded to include all processors using molasses—but that's academic because Publicker is the only major firm using this raw material.

Strictly controlled conditions of sale will prevent any special advantages that might otherwise accrue from purchase of government corn. Prices are subject to adjustment to prevent excessive profits, use of the corn is restricted to production of industrial alcohol, and sale to buyers will be limited according to each user's normal annual alcohol output.

Hint of a possible new look in his chemical enterprise comes from President Lowell Berry of Best Fertilizer Co. (Lathrop, Calif.). He says his firm is casting about for potential new product lines to diversify manufacturing operations from strictly fertilizer and agricultural chemicals patterns. He lists no definite projects; but trade observers think that items such as methanol and formaldehyde are getting close scrutiny.

•

Inclination of Best Fertilizer to move further afield in chemical manufacturing takes on added significance in light of the firm's past influence in the marketplace. Several years ago Best threw the West Coast anhydrous ammonia market into turmoil with notices of reduced-price ammonia from the plant it was building (*CW Market Newsletter, Sept. 28, Nov. 1, '58*).

•

Meanwhile Best is backing up fertilizer line by organizing a new agricultural chemicals division. Plans call for installation of formulating and blending units at the firm's Lathrop, Calif., plant for making its own line of herbicides, pesticides, fungicides and miticides. Best now distributes for several major basic manufacturers of ag-chemicals and is marketing pesticides on a small scale.

This statewide move follows formation of a Hawaiian subsidiary —Best Fertilizer and Chemicals of Hawaii. Through warehousing and marketing experience Best is "getting the feel" to evaluate the potential for island-based manufacturing projects.

•

Expansion of butyl rubber capacity is still in the cards for Polymer Corp. (Sarnia, Ont.). The firm's '61 capital budget includes provision for such expansion; and detailed studies on location and plant size are almost complete—but have not yet been revealed.

There were earlier indications that a butyl unit was being considered by Polymer for Europe. But plans were delayed because of Esso's decision to put up a $12.5-million, 25,000-tons/year butyl unit near Southampton and because of uncertainty about trade bloc relationships.

•

Du Pont has changed its polyvinyl fluoride film trademark to Tedlar (previously Teslar) to avoid possible confusion with another existing trademark.

SELECTED PRICE CHANGES—Week Ending April 24, 1961

	Change	New Prices
UP		
Cadmium chloride, 400-lb. dms., f.o.b. shipping point	$0.075	$1.565
Cadmium nitrate, purif. cryst., 5,000 lbs. or more	0.03	0.90
DOWN		
Tung oil, dms., N.Y.	$0.0025	$0.285
Tin, metal (Straits)	0.01	1.08

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3. 1, 3-Dibromo-5, 5-dimethylhydantoin — $(CH_3)_2$ CN(Br)CON(Br)CO Fine, stable powder with a minimum active bromine content of 54%. An effective and economical reagent for controlled brominations of aromatic and unsaturated aliphatic compounds, especially in the allylic position.

4. Tetramethyl Ammonium Chlorodibromide— $(CH_3)_4$ $NClBr_2$ Orange crystalline solid (59.4% available bromine). An easily handled solid which yields elemental bromine.

5. Phosphorus Tribromide—PBr_3 Colorless or slightly yellowish clear liquid. Used in the preparation of organic bromides, especially for brominating alcohols without rearrangement. Also used as a catalyst and analytical reagent.

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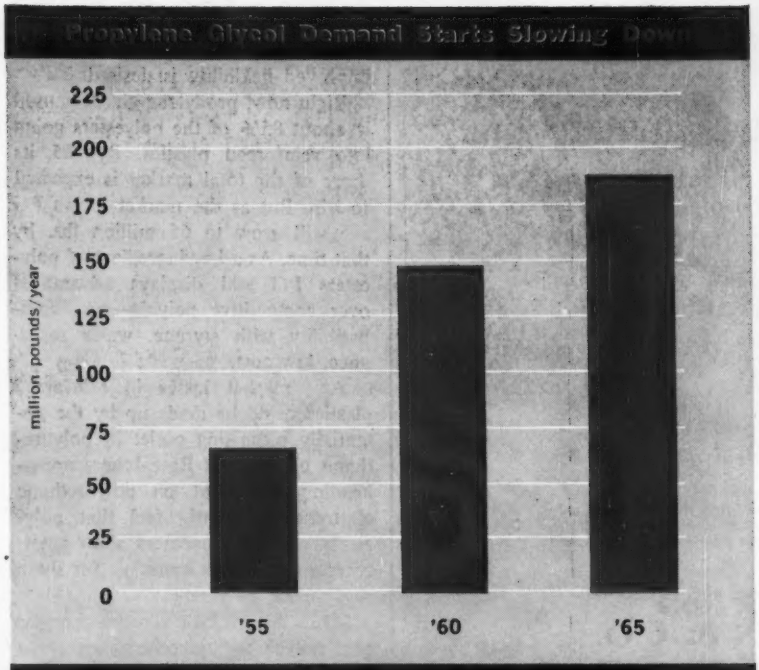

Propylene Glycol Estimated End Use Pattern

	million pounds/year '55	'60	'65
Polyesters	15	45	80
U.S.P. grade	28	33	35
Cellophane	0	25	30
Plasticizers	5	11	17
Export	5	20	10
Brake fluids	5	5	5
Misc.	7	8	10
	65	147	187

Propylene Glycol Plateaus

After five years of surging growth, propylene glycol demand now shows signs of leveling off (chart). Two important contributors to its past demand spurt—polyesters and plasticizers—will continue strong, but their gains will not be enough to keep propylene glycol moving at the rate achieved during '55-'60.

In '60 demand for this basic chemical hit a high of 147 million lbs., more than double '55 consumption of 65 million lbs. By '65 consumption is expected to climb, albeit slowly, to 187 million lbs.—an increase of less than 30%.

Four major end-uses contributed to propylene glycol's growth during '55-'60: polyesters, plasticizers, cellophane, exports. The demand rate for PG in polyesters and plasticizers will continue to climb sharply through '65. But PG requirements in cellophane will grow slowly; and by '65 exports will be off at least 50% from '60 levels (*see table, above*). The latter two factors will combine to cut PG's over-all growth rate.

Slowdown in Cellophane: PG is used as a humectant plasticizer in cellophane. About 25 million lbs. went into cellophane in '60; none was consumed in '55. By '65, PG consumption should move up to about 30 million lbs./year.

PG usage in cellophane received a big boost in '58 from a Food and Drug Administration ruling concerning the safety of a food packaging material. Until '55 glycerin and ethylene glycol had the lion's share of this cellophane market. But the '58 Food Amendment to the Food, Drug and Cosmetic Act ruled ethylene glycol out of the picture and PG took over. Right now, propylene glycol's future in this application is dependent upon the over-all growth of cellophane. During '60 cellophane production reached an all-time high of 439 million lbs.—an increase of almost 90 million lbs. over '55's total.

But cellophane is facing fierce competition from the newer plastic packaging materials—e.g., polyolefins, polyesters—and competition promises to become keener when new packaging products are introduced. Result: cellophane's market growth will be curtailed. By '65 production of this film is expected to be under 480 million lbs./year—less than a 10% gain. Propylene glycol would likewise experience slow growth in this outlet.

Exports of PG also showed big gains during the past five years. In '60 about 20 million lbs. were shipped, compared with 5 million in '55. Because of propylene glycol capacity buildup overseas, however, current outlook for exports is bleak—demand for the U.S.-produced material is expected to decline rapidly. By '65 it may be 10 million lbs./year.

Sparking the Gains: On the brighter side, polyesters represented the major end-use for propylene glycol last year. This outlet promises to become even more important in the years ahead. During '60 polyesters consumed about 45 million lbs., three times the level of five years ago. The big share of PG-based polyesters went into reinforced-plastics manufacture, but polyesters for urethane elastomers represent a sizable future potential for this polyhydric alcohol.

Demand for reinforced plastics hit 250 million lbs. in '60—two and a half times the '55 level of 100 million (*CW, Feb. 18, p. 131*). And this growth is just hitting its stride. By '65 demand will be about 475 million lbs./year.

But propylene glycol will face stiff competition from other polyhydric alcohols. Celanese, for example, is

aiming at the polyester market with 1,3-butylene glycol; and diethylene glycol is currently making inroads into the isophthalic polyesters where improved flexibility is desired.

Right now, propylene glycol is used in about 85% of the polyesters going into reinforced plastics. By '65 its share of the total market is expected to slip. But as the market grows PG use will grow to 65 million lbs. by that time. As a key ingredient of polyesters PG still displays advantages over competitive polyols—e.g., compatibility with styrene, water resistance, low cost.

Any market losses in reinforced plastics could be made up by the potentially promising outlet in polyurethane elastomers. Researchers spearheading the effort on polyurethane elastomers currently feel that polyesters, and not polyethers, show greater promise as raw materials for these elastomeric polymers.

While there is little agreement on the best polyol for manufacturing these polyesters, at least one company is bullish on the future of PG as a precursor in this application.

Since the forecasters peg the market for these new polymers at 50 million lbs./year within the next several years, the total market for PG in this use could swell rapidly to over 10 million lbs./year.

Polymeric plasticizers are also a promising growth area. In '60 about 11 million lbs. of PG were channeled into the manufacture of these polymers—double '55's consumption of 5 million lbs. These plasticizers (polyesters of controlled molecular weight) have found rapid acceptance in high-temperature applications where plasticizers must be nonmigrating and have low volatility characteristics. These high-temperature, low-cost materials—especially the polyvinyl chloride variety—have been growing rapidly and show solid evidence of continued rapid growth. By '65 plasticizer demand for PG could reach at least 17 million lbs.

In addition, numerous other propylene glycol applications fill out the end-use picture, though each is likely to register only small gains by '65.

Clearly, the prospects for PG are not completely discouraging. But at the same time, the growth of this chemical will not resemble the boom of the past five years.

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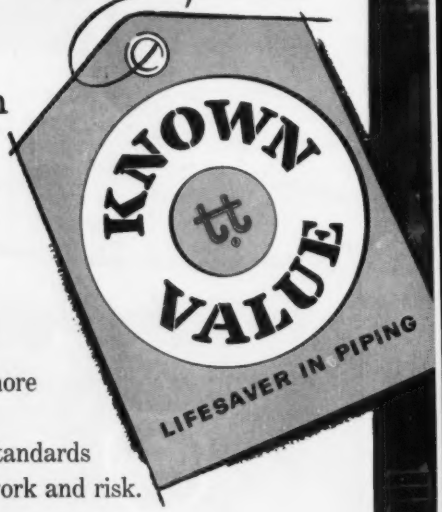

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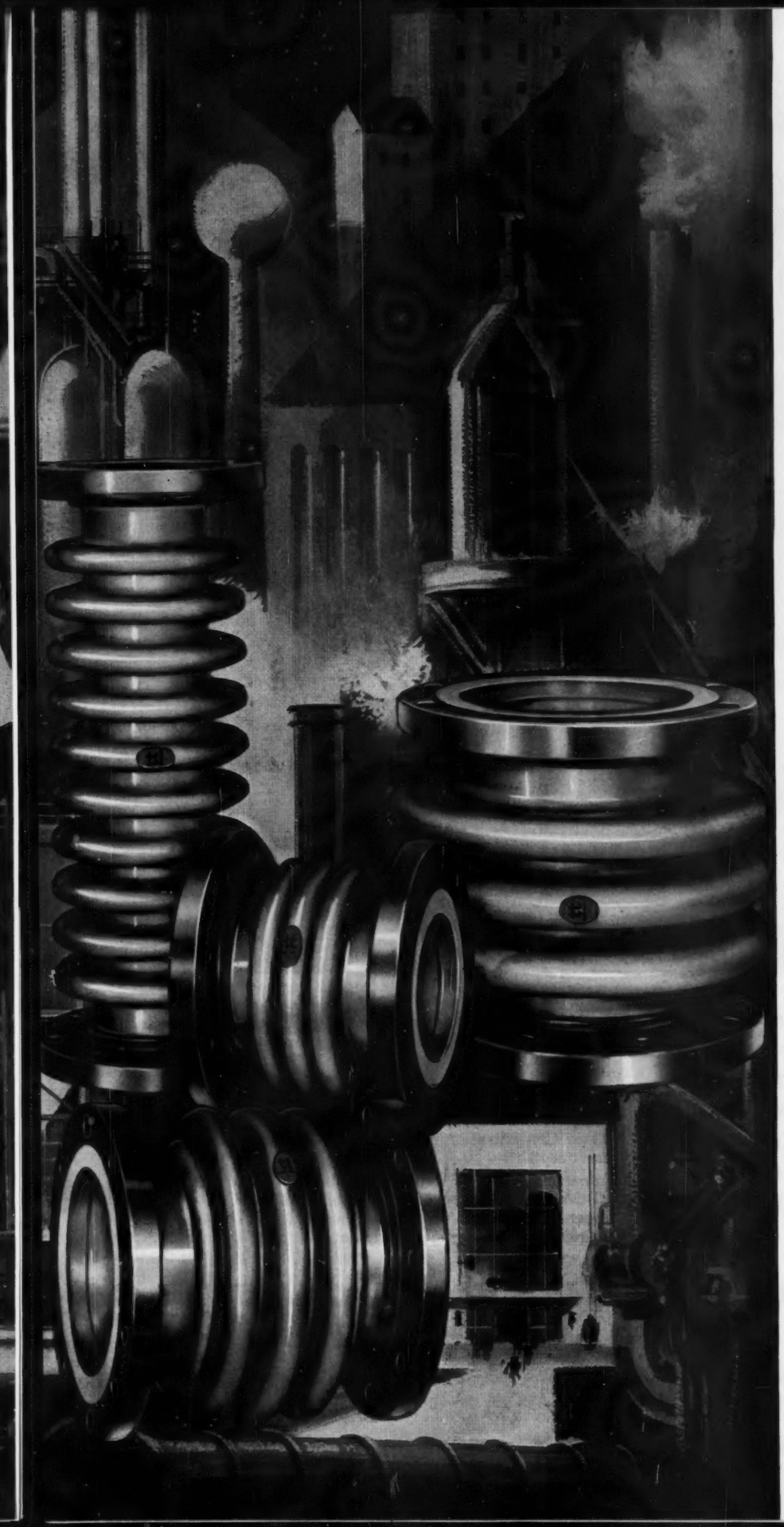

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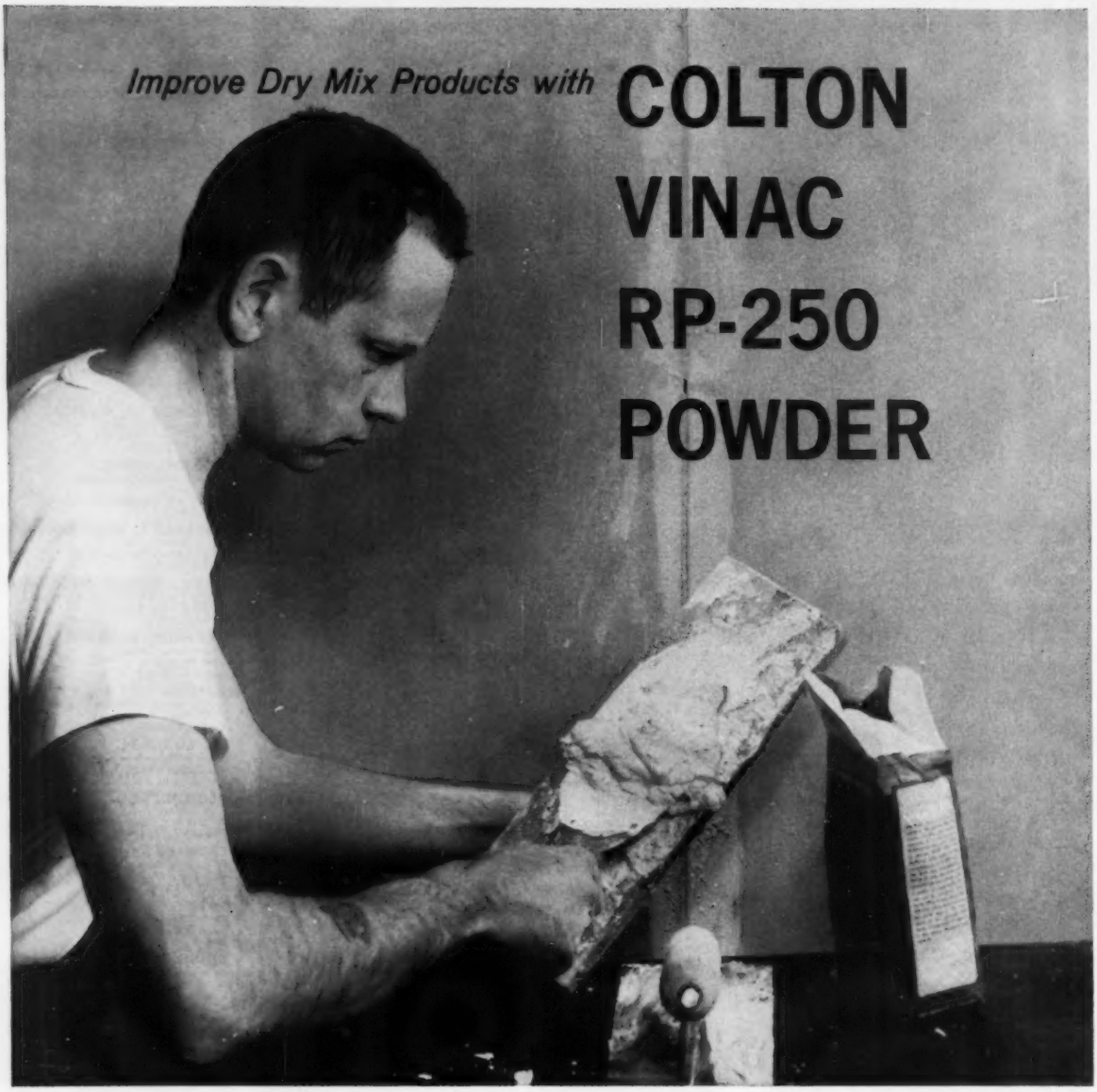

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MASS FLOWMETERS . .		
WHO MAKES THEM	**WHAT THEY MEASURE**	**WHAT THEY COST**
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Foxboro Co., Foxboro, Mass.	Phosphate, cement, rock slurries	$4,000 and up
Fischer & Porter Co., Hatboro, Pa.	Sewage slurries now; cement, food processes and chemicals shortly	$4,000 — $40,000
Gulton Industries, Inc., Metuchen, N.J.	Seawater in submarines, sewage slurries	$4,000 and up
Potter Aeronautical Co., Union, N.J.	Cryogenic fluids, multicomponent fluids, refinery gases	$1,400 — $2,000
Wallace & Tiernan Inc. Belleville, N.J.	Dry chemical and mineral solids	$2,000 and up
Ohmart Corp. Cincinnati, O.	Dry solids, cement, sugar	$2,500 — $5,500

Mass Flowmeters Weigh in for New Jobs

At West Lynn, Mass., this week General Electric is rushing completion of its new laboratory for the development of mass flowmeters. Reason: after more than four years of cautious testing by the chemical industry, mass flowmeters are beginning to catch on.

Swift & Co., International Minerals and Chemical, Arkansas Cement, Ethyl Corp. and at least a half-dozen other major chemical companies—all chary about discussing the matter—have installed, or are evaluating, mass flowmeters. Esso Research is interested in one for ethylene service; and Dow has admitted it is evaluating a meter, but won't say more.

In addition to GE, six others are already making mass flowmeters for use by the chemical industry (*see table, above*). And Taylor Instruments is ready to enter the field.

Chemical production men are anxious to install the devices because of the growing need for increased accuracy and reliability in measuring process streams. The insistence on exact flow rates vital to automation, the increased value of raw materials and finished product, the tighter control of reactant feed rates to meet finer product specifications, and the weight requirements of chemical bulk shippers have created this need. Mass flowmeters answer it by weighing the process stream directly, without depending on error-prone manual corrections for temperature, pressure and viscosity.

These meters are in two categories: true, and effective. The true mass flowmeter (e.g., GE's) depends solely on the mass of the fluid that is passing through it. It is an integrated instrument. The effective mass flowmeter is a volumetric device, requiring an auxiliary element to compensate for fluid density changes. It is generally made up of standard electronic components—e.g., Foxboro Co.'s electromagnetic instrument (*see Dimension, p. 92, and CW, March 3, '56*).

GE Ahead of Field: General Electric's flowmeter appears to have the jump on the other meters in the number and diversity of installations. The unit used to measure jet fuel was selling well prior to March '59. The unit, codeveloped with equipment maker Black, Sivalls & Bryson, Inc., for the chemical and natural gas industries, came out in early '60 (*CW, March 23, '59*). BS&B has the sole rights in the natural gas and petroleum industry, where the firm has numerous installations.

The GE true mass flowmeter, unaffected by changes in fluid density, is designed for use with natural gas, oil and oil products. It readily lends itself to telemetering, computer input, and remote reading and recording devices.

But electromagnetic mass flowmeters are beginning to move into the chemical industry, paced by the older Foxboro meter and by Fischer & Porter's. The Bowser Co., which did some early development work on this type, patented a detail of construction of the electromagnetic meter and licensed it to Foxboro and F&P.

Taylor Instrument Co., about to enter a mass flowmeter in the chemical field, already has volumetric flowmeters in chemical plants. Right now the firm is in the process of completing a new flowmeter calibration laboratory.

Several plants have installed the Foxboro unit. For example, Swift's four-year-old unit at Bartow, Fla., and International Minerals' installation (also at Bartow) are measuring phosphate slurries. Arkansas Cement

(Foreman, Ark.) has a unit metering rock slurries. As yet, Foxboro has no meters in other types of chemical plants, although its magnetic volume flowmeter is used by several companies.

Several Fischer & Porter mass flowmeters (quite similar to Foxboro's) are operating in sewage plants and metering sand in dredging operations. The firm hopes to have several meters installed in chemical plants in the near future.

Several factors are helping these meters to catch on: they can be made from a variety of alloy and lined materials; they have no moving parts; they're corrosion resistant and can handle nitric, sulfuric and phosphoric acids. Except for two electrodes imbedded in the line, the inside of the pipe is unobstructed, which avoids pressure drop.

Newcomer: Ultrasonic mass flowmeters are also making a bid for a place on the chemical plant instrument shelf. Gulton Industries has developed a meter of this type, and a pilot model for the chemical industry will be ready this July. Currently the unit is used in the control system of the Polaris-armed submarines and in the coolant systems of nuclear reactors. Gulton teamed up with Hersey-Sparling Me-

DIMENSION

Mass Flowmeters: How They Work

True mass flowmeter measures mass of flowing fluid directly, requires no correction for temperature, pressure and viscosity.

Transverse momentum type: Fluid flowing downstream passes through an impeller, which rotates at constant angular velocity. Impeller gives fluid a momentum perpendicular to the normal flow stream. A turbine, held in place by a spring downstream from the impeller, straightens out the fluid stream. The torque on the spring, produced by the stream straightening, is transmitted to a gyroscope, which translates it to a readable signal.

General Electric's meter operates in this manner. Potter Aeronautical's meter has no impeller, instead has two turbines with different blade angles. The two turbines are coupled by a torque spring, and rotate as a unit. The Potter unit requires no external power source; a power source operates GE's impeller.

GE's unit is accurate to ±1%, has repeatibility to ±¼% (will remain calibrated for more than a year, GE claims). Capacity: 53,000 lbs./hour of gas; 320,000 lbs./hour of liquid. Potter's unit is accurate to within ±1%.

Solids-flow type: Solid particles fall onto a rotating impeller, driven by a synchronous motor. Particles are accelerated to a constant angular velocity, exerting a torque on the motor housing, which is balanced pneumatically. Air input to the pneumatic balancer is proportional to the mass rate of flow. Wallace & Tiernan makes a unit of this type, called the Massometer, for free-flowing solids. The unit has a ±½% accuracy, ±0.2% repeatibility.

Effective mass flowmeter measures mass of flowing fluid by combining volumetric and density-compensation measurements.

Ultrasonic type: Sound waves are introduced into the flow stream and their travel time or deflection in the stream is measured. Density changes are compensated for acoustically; temperature changes are compensated for electronically. Gulton Industries makes a flowmeter of this type, which sends a sound wave across the flow stream. The deflection of the sound wave by the flow of the stream is measured by receivers, which translate it into electrical signals (*CW, Mar. 19, '60, p. 50*). The meter is accurate to ±1%, has a repeatibility of ±2%.

Electromagnetic type: Voltage is developed by fluid stream flowing over two electrodes imbedded in a pipe. The voltage is combined with a signal from a radiation-type density gauge. Foxboro and Fischer & Porter make units of this type. Both units are accurate to ±2%. Foxboro's unit uses a gamma-ray density cell; Fischer & Porter's unit uses Ohmart's radioisotope density gauge.

Solids-flow: A continuous weighing instrument gives the weight of free falling matter, either on a conveyor belt or falling down a chute, by calibrating the velocity of the solids and the force of gravity with the density of the material. Ohmart Corp. makes the device, uses its radioisotope density gauge.

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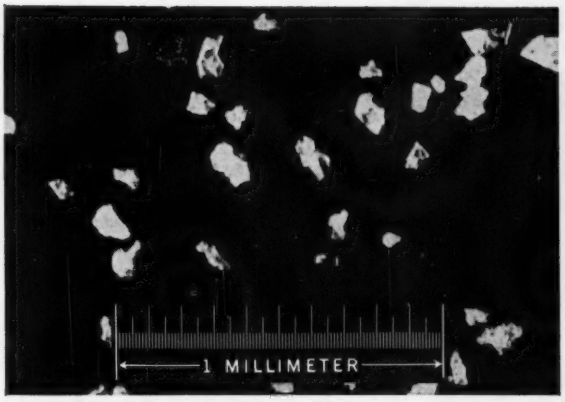
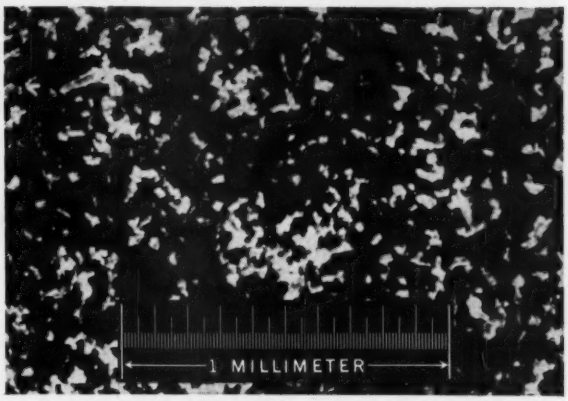
FROM CHURCH & DWIGHT



Sodium Bicarbonate U.S.P. Powdered No. 1—For general purpose use in chemical processing, dyestuffs, adhesives, starches, textiles and industrial applications.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

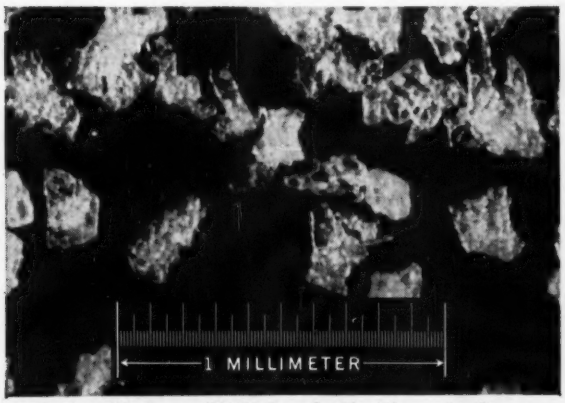
42 Mesh	Trace	200 Mesh	35.0%
100 Mesh	.5%	325 Mesh	70.0%
170 Mesh	20.0%	400 Mesh	80.0%



Sodium Bicarbonate U.S.P. Fine Powdered No. 3DF for use specifically in dry powder fire extinguisher mixes, also in rubber and plastics blowing, lubricant for sheet vinyl.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

170 Mesh	Trace	325 Mesh	25.0%
200 Mesh	2.0%	400 Mesh	45.0%



Sodium Bicarbonate U.S.P. Granular No. 5 for use in effervescent salts, other pharmaceuticals and special types of cleansers.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

42 Mesh	Trace	100 Mesh	92.5%
65 Mesh	27.0%	170 Mesh	99.0%
80 Mesh	66.5%		

Sodium Bicarbonate U.S.P. Treated Free-Flowing for use in fire extinguishers and sponge rubber.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

42 Mesh	Trace	200 Mesh	35.0%
100 Mesh	.5%	325 Mesh	70.0%
170 Mesh	20.0%	400 Mesh	80.0%

Are you getting Sodium Bicarbonate of the specific grain size for optimum results in your process or for maximum shelf life and performance of your products? You can eliminate doubts by specifying Church & Dwight. This simple step will assure you of obtaining the widest selection of grain sizes available because Church & Dwight is the country's largest supplier of Sodium Bicarbonate U.S.P. You'll also receive for the asking unmatched technical service based on more than 100 years of experience with Sodium Bicarbonate. Unusual grain size requirements are given special attention. Try us and see. For technical data on all grades of Sodium Bicarbonate, send for brochure, "Church & Dwight Sodium Bicarbonate—How It Serves Industry Today."

CHURCH & DWIGHT CO., INC., 70 PINE STREET, NEW YORK 5, N. Y.

ter Co. to develop a meter for sewage applications. Gulton feels that its unit will be useful in measuring dangerous streams—i.e., radioactive, highly corrosive liquids and gases.

The ultrasonic meter boasts several unique features. All the instrumentation is outside the pipe. There's nothing to foul, erode or wear out inside. Corrosion presents no problem because all types of alloys or linings may be used.

Another true mass flowmeter striving for acceptance as standard chemical instrumentation has been developed by Potter Aeronautical. Bowser has collaborated with Ethyl Corp. to install a super-accurate (±1%) Pottermeter in a multicomponent blending operation. The blending involves tetraethyl and tetramethyl lead, is completely automated. A punched card with the desired blend is placed in a computer and the batch is blended automatically.

Potter has captured the cryogenic field. Here, several units operating at —400 F attest to the instrument's reliability. One Midwest refinery is using a Pottermeter to measure nitrogen, ammonia and hydrogen. Several are measuring aircraft fuel.

Another type of meter active in the chemical field is the solid-mass flowmeter. Wallace & Tiernan's Massometer, which directly measures the weight of free-flowing solids, is operating in several large chemical and mining plants. Features claimed for it: it gives accurate weight and product monitoring; and its 3-15-lbs. air output can be transmitted to a recorder or fed back to a control loop for batching operations.

But the Massometer may be receiving stiff competition shortly from Ohmart Corp.'s newly developed solid-mass flowmeter. Ohmart has submitted quotes to several large chemical companies for use of its meter in a multitude of processes—i.e., alumina and fluorspar measurement. The instrument records the weight of free-falling solids by calibrating the conveyor belt speed and the force of gravity with the material density.

All that Glitters: But the mass flowmeter picture is not as rosy as it seems. One big question many production people raise: Are the meters worth their high cost, which ranges from $1,500 to $40,000, depending on the size and accuracy of the unit? There is

disagreement between some production men and the instrument makers on this point.

One West Coast user of the GE meter (one of the lower-cost units) says that the high price is not justified because the other areas of the process can't match up to the mass meter's accuracy. GE feels that the high cost should not be considered a problem. It believes that when the potential savings accrued in large-volume operations is balanced in, the cost is warranted.

But cost is not the only limitation of the meters that concerns chemical manufacturers. Some of these drawbacks are admitted by the meter makers.

For example, GE concedes that the upper temperature limit of its mass flowmeter is 165 F (this limit may be expanded somewhat in certain limited applications). Corrosive liquids are also admittedly troublesome—one of the reasons why GE likes to custom-design each unit, given the stream composition. (When the instrument gets out of calibration, it may be sent back to GE for resetting.)

But despite these problems, most production men are eager to try the mass flowmeters. For example, a large West Coast petrochemical firm is trying the GE unit in its manufacturing department. The company is changing some of the parts to adapt the instrument to petroleum service. Some Gulf Coast ethylene plants have installed the GE unit but are double-checking with standard orifice meters.

Electromagnetic meters are no panacea. They will not work with nonconducting solutions, which rules out many organics. In rebuttal, Fischer & Porter says it can handle liquids with conductivities ranging from hydrocarbons to acids.

Gulton also admits that there are some problems that must be solved with its meter. For instance, it won't handle highly viscous liquids, which absorb sound waves. In another case, entrained gas can upset the instrument. Other limitations, now being worked on: flow rate minimum is 15 gpm.; and the smallest usable pipe size is 2 in.

Despite mass flowmeter's growing pains evidence generally points to their ready acceptance—if they can meet the challenge of ever-growing need for accuracy and reliability.

Chemical Week

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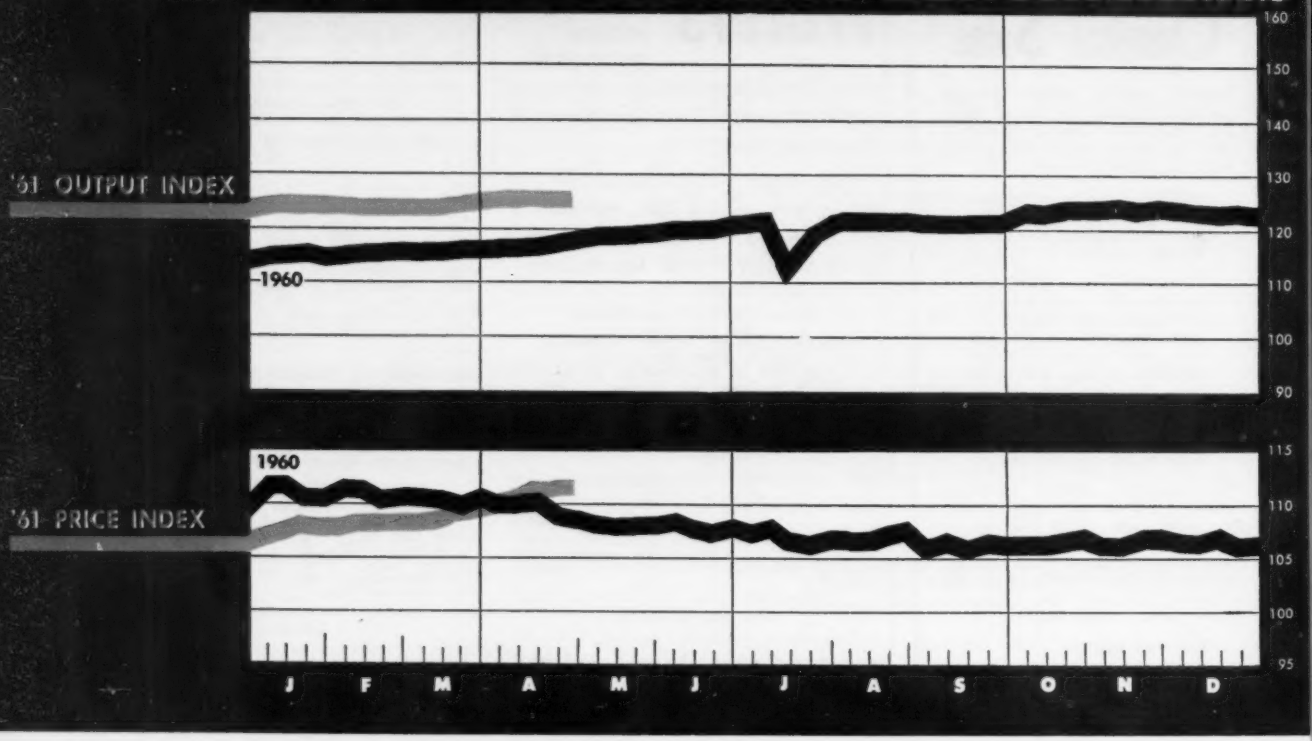
BUSINESS BENCHMARKS



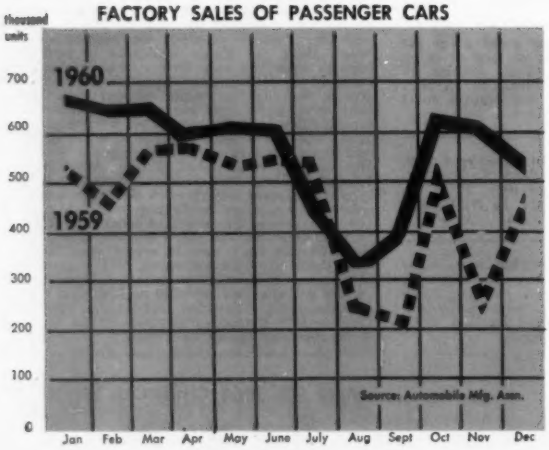
APRIL 29, 1961

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	126.2	126.0	120.4
Chemical Week wholesale price index (1947=100)	112.7	112.5	109.3
Stock price index (12 firms, Standard & Poor's)	51.36	51.74	51.48
Steel ingot output (thousand tons)	1,748	1,696	2,225
Electric power (million kilowatt-hours)	14,434	14,182	13,617
Crude oil and condensate (daily av., thousand bbls.)	7,248	7,226	7,031

EMPLOYMENT INDICATORS (Thousands)	Latest Month	Preceding Month	Year Ago
All manufacturing	15,471	15,583	16,520
Nondurable goods	6,670	6,669	6,840
Chemicals and allied products	869.8	869.7	864.6
Paper and allied products	543.6	546.9	559.9
Rubber products	243.2	247.4	269.0
Petroleum and coal products	214.4	217.2	232.4

CHEMICAL CUSTOMERS CLOSE-UP

FACTORY SALES OF PASSENGER CARS



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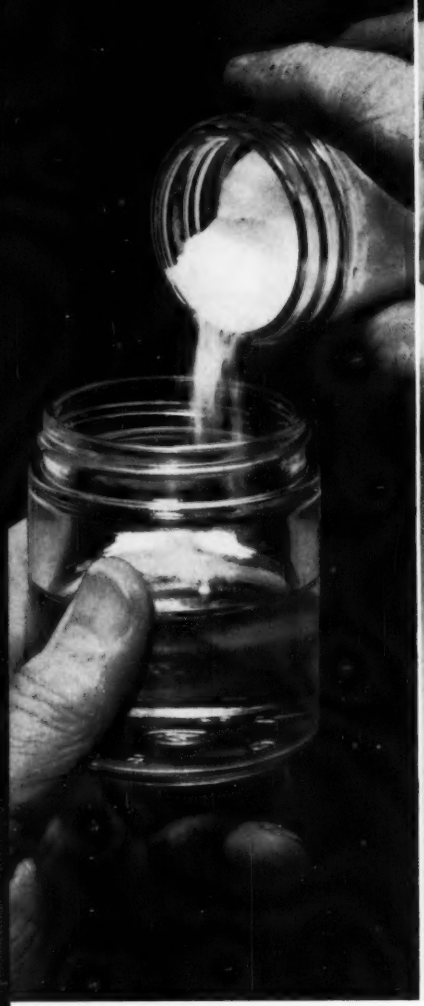

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